MASSACHUSETTS

STATE NORMAL SCHOOLS,

CONTAINING

A CIRCULAR OF INFORMATION, A CIRCULAR OF ADVICE TO "ONE WHO WISHES TO BECOME A TEACHER,"

AND THE

NORMAL SCHOOL ADMISSION EXAMINATION PAPERS FROM 1896 TO 1901 INCLUSIVE.

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MASSACHUSETTS STATE NORMAL SCHOOLS.

This collection of circulars and examination questions is intended for the guidance of high school pupils who are intending to train themselves for the vocation of teaching. It should be kept in the school library, and the attention of candidates for admission to the State normal schools should be frequently called to its contents.

The standard of admission to the State normal schools was raised in 1896 to include high school subjects. Since that date the admission questions have presupposed a four years' course in the high school or its equivalent. This pamphlet contains all the admission questions, under the new standard, from 1896 to 1901 inclusive, — being the June and September sets for each year, or twelve sets in all.

Certain features of the written examination for admission merit special notice: —

1. The examination places primary stress upon power rather than on mere information.

2. It attaches more consequence to the candidate's attainments than to his deficiencies.

3. It regards the orderly marshalling and fair presentation of a body of resources more highly than the furnishing of single or isolated facts, however accurately, in response to narrow questioning.

4. It invites large views of things, the principles and causes of things, rather than mere details, — those greater things that are more likely to abide as the result of sound training than those minor things that people seldom carry as permanent possessions.

5. It aims to encourage methods of study in the high school that are valuable in themselves, and should be pursued whether the examination encourages them or not.

6. It is not the sole and final criterion in determining the candidate's fitness. It is presumed that a four years' course in a high school counts for a great deal which the admission examination cannot reach. The candidate's record in the high school, his personality and any supplementary evidences of fitness he may see fit to furnish, — all these are factors in determining whether or not he is duly qualified to enter a normal school.

For an exposition of the spirit underlying the normal school admission examinations, consult the sixty-third annual report of the Massachusetts State Board of Education, pages 210–218.

SEPTEMBER, 1901.

In the Service of the Commonwealth.

STATE BOARD OF EDUCATION.

STATE HOUSE, BOSTON, September, 1901.

CIRCULAR OF INFORMATION.

☞ *Principals of schools and others whom this circular may reach are requested to bring it to the notice of young people who wish to become teachers. Such persons should be found out, if possible, at the beginning of their high school course and wisely advised about their plans of work.*

THE NORMAL SCHOOLS.

Massachusetts has ten normal schools. The following table gives their location in the order of their organization, with their present principals: —

NORMAL SCHOOLS.	First Opened.	Present Principal.
Framingham,	July 3, 1839, at Lexington,	Henry Whittemore.
Westfield,	Sept. 4, 1839, at Barre,	Clarence A. Brodeur.
Bridgewater,	Sept. 9, 1840,	Albert G. Boyden.
Salem,	Sept. 14, 1854,	Walter P. Beckwith.
Boston, Normal Art,	Nov. 11, 1873,	George H. Bartlett.
Worcester,	Sept. 15, 1874,	E. Harlow Russell.
Fitchburg,	Sept. 11, 1895,	John G. Thompson.
North Adams,	Feb. 1, 1897,	Frank F. Murdock.
Hyannis (Barnstable),	Sept. 9, 1897,	W. A. Baldwin.
Lowell,	Oct. 4, 1897,	Frank F. Coburn.

REQUIREMENTS FOR ADMISSION.

Candidates for admission to any one of the normal schools must have attained the age of sixteen years complete, if young women, and seventeen years, if young men; and must be free from any disease or infirmity which would unfit them for the office of teacher. They must present certificates of good moral standing, give evidence of good intellectual capacity (*records of their scholarship standing in the high schools are required*) and be graduates from the four years'

courses of reputable high schools; or they must have received, to the satisfaction of the principal and the board of visitors of the school, the equivalent of a good high school education. They must also declare their intention to teach. The examinations for admission shall cover such elementary and high school subjects as may be determined by the Board of Education.

Written Examination.

The examinations will embrace papers on the following groups of subjects, a single paper with a maximum time allowance of two hours to cover each of groups I., II. and IV., and a single paper with a maximum time allowance of one hour to cover each of groups III. and V. (*five papers with a maximum time allowance of eight hours*): —

I. *Languages.* — (*a*) English, with its grammar and literature, and (*b*) one of the three languages, — Latin, French and German.

II. *Mathematics.* — (*a*) Arithmetic, (*b*) the elements of algebra and (*c*) the elements of plane geometry.

III. *History and Geography.* — The history and civil government of Massachusetts and the United States, with related geography and so much of English history as is directly contributory to a knowledge of United States history.

IV. *Sciences.* — (*a*) Physical geography, (*b*) physiology and hygiene, (*c*) physics, (*d*) chemistry and (*e*) botany.

V. *Drawing and Music.* — (*a*) Elementary, mechanical and free-hand drawing, with any one of the topics, — form, color and arrangement, and (*b*) musical notation.

Oral Examination.

Each candidate will be questioned orally either upon some of the foregoing subjects or upon other matters within his experience, in order that the examiners may gain some impression about his personal characteristics and his use of language, as well as give him an opportunity to furnish any evidences of qualification that might not otherwise become known to them. Any work of a personal, genuine and legitimate character that the candidate has done in connection with any of the groups that are set for examination, and that is susceptible of visible or tangible presentation, may be offered at this time, and such work will be duly weighed in the final estimate, and may even determine it. To indicate the scope of this feature, the following kinds of possible presentation are suggested, but the candidate may readily extend the range of choice: —

1. A book of drawing exercises, — particularly such a book of exercises as one might prepare in following the directions, or any portion of them, in "An Outline for Lessons in Industrial Drawing in

Primary and Grammar Schools," prepared under the direction of the Massachusetts Board of Education.

2. Any laboratory notebook that is a genuine record of experiments performed, data gathered or work done, with the usual accompaniments of diagrams, observations and conclusions.

3. Any essay or article that presents the nature, successive steps and conclusion of any simple, personally conducted investigation of a scientific character, with such diagrams, sketches, tables and other helps as the character of the work may suggest.

4. Any exercise book containing compositions, abstracts, analyses or other written work that involves study in connection with the literature requirements of the examination.

Special Directions for the Written Examination.

Group I. Languages.

(*a*) *English.* — The subjects for the examination in English will be the same as those agreed upon by the colleges and high technical schools of New England and now quite generally adopted throughout the United States. Candidates are strongly advised to read *all* the works named, either in school or by themselves, but, until further notice, they may expect to meet the requirements of the papers set if they have properly prepared themselves upon more than half of the works assigned under each of the two heads of *Reading and Practice* and *Study and Practice*, the selection to be made by themselves or by their schools.

No candidates will be accepted whose written English is notably deficient in clear and accurate expression, spelling, punctuation, idiom or division of paragraphs, or whose spoken English exhibits faults so serious as to make it inexpedient for the normal school to attempt their correction. The candidate's English, therefore, in all oral and written examinations will be subject to the requirements implied in the statement here made, and marked accordingly.

1. *Reading and Practice.* — A limited number of books will be set for reading. The candidate will be required to present evidence of a general knowledge of the subject-matter and spirit of the books, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of a few topics to be chosen by the candidate from a considerable number set before him in the examination paper. In place of a part or the whole of this test, the candidate may present an exercise book *properly certified by his instructor*, containing compositions or other written work done in connection with the reading of the books.

The books set for this part of the examination will be: —

1902. — Shakespeare's *The Merchant of Venice;* Pope's *Iliad*, Books I., VI., XXII. and XXIV.; *The Sir Roger de Coverley Papers* in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Scott's *Ivanhoe;* Cooper's *The Last of the Mohicans;* Tennyson's *The Princess;* Lowell's *The Vision of Sir Launfal;* George Eliot's *Silas Marner.*

1903–1905. — Shakespeare's *The Merchant of Venice* and *Julius Cæsar*; *The Sir Roger de Coverley Papers* in *The Spectator*; Goldsmith's *The Vicar of Wakefield*; Coleridge's *The Ancient Mariner*; Scott's *Ivanhoe*; Tennyson's *The Princess*; Lowell's *The Vision of Sir Launfal*; George Eliot's *Silas Marner*; Carlyle's *Essay on Burns*.

2. *Study and Practice.* — This part of the examination presupposes a more careful study of each of the works named below. The examination will be upon subject-matter, form and structure.

In addition, the candidate may be required to answer questions involving the essentials of English grammar, and questions on the leading facts in those periods of English literary history to which the prescribed works belong. The books set for this part of the examination will be: —

1902–1905. — Shakespeare's *Macbeth*; Milton's *Lycidas*, *Comus*, *L'Allegro* and *Il Penseroso*; Burke's *Speech on Conciliation with America*; Macaulay's *Essays on Milton and Addison*.

(*b*) One only of the three languages, — *Latin*, *French* and *German*. The translation at sight of simple prose, with questions on the usual forms and ordinary constructions of the language. The candidate is earnestly advised to study *Latin* and either *French* or *German*.

The Conference on Uniform Requirements in English for Admission to College, on whose recommendations the foregoing lists of books in English and directions for study are based, advises —

1. That English be studied throughout the primary and secondary school courses, and, when possible, for at least three periods a week during the four years of the high school course.

2. That the prescribed books be regarded as a basis for such wider courses of English study as the schools may arrange for themselves.

3. That, where careful instruction in idiomatic English translation is not given, supplementary work to secure an equivalent training in diction and in sentence structure be offered throughout the high school course.

4. That a certain amount of outside reading, chiefly of poetry, fiction, biography and history, be encouraged throughout the entire school course.

5. That definite instruction be given in the choice of words, in the structure of sentences and of paragraphs, and in the simple forms of narration, description, exposition and argument. Such instruction should begin early in the high school course.

6. That systematic training in speaking and writing English be given throughout the entire school course. That, in the high school, subjects for compositions be taken partly from the prescribed books and partly from the students' own thought and experience.

7. That each of the books prescribed for study be taught with reference to (*a*) the language, including the meaning of the words and sentences, the important qualities of style and the important allusions; (*b*) the plan of the work, *i.e.*, its structure and method; and (*c*) the place of the work in literary history, the circumstances of its production and the life of its author. That all details be studied, not as ends in themselves, but as means to a comprehension of the whole.

II. Mathematics.

(*a*) *Arithmetic.* — Such an acquaintance with the subject as may be gained in a good grammar school.

(*b*) *Algebra.* — The mastery of any text-book suitable for the youngest class in a high school, through cases of affected quadratic equations involving one unknown quantity.

(*c*) *Geometry.* — The elements of plane geometry as presented in any high school text-book. While a fair acquaintance with ordinary book work in geometry will, for the present, be accepted, candidates are advised, so far as practicable, to do original work with both theorems and problems, and an opportunity will be offered them, by means of alternative questions, to test their ability in such work.

III. History and Geography.

Any school text-book on United States history will enable candidates to meet this requirement, provided they study enough of geography to illumine the history, and make themselves familiar with the grander features of government in Massachusetts and the United States. Collateral reading in United States history is strongly advised.

IV. Sciences.

(*a*) *Physical Geography.* — The mastery of the elements of this subject as presented in the study of geography in a good grammar school. If the grammar school work is supplemented by the study of some elementary text-book on physical geography, better preparation still is assured.

(*b*) *Physiology and Hygiene.* — The chief elementary facts of anatomy, the general functions of the various organs, the more obvious rules of health, and the more striking effects of alcoholic drinks, narcotics and stimulants upon those addicted to their use.

(*c*), (*d*) and (*e*) *Physics, Chemistry and Botany.* — The elementary principles of these subjects so far as they may be presented in the courses usually devoted to them in good high schools. Study of the foregoing sciences, or of some of them, with the aid of laboratory methods is earnestly recommended.

V. Drawing and Music.

(*a*) *Drawing.* — Mechanical and freehand drawing, — enough to enable the candidates to draw a simple object, like a box or a pyramid or a cylinder, with plan and elevation to scale, and to make a freehand sketch of the same in perspective. Also any one of the three topics, — form, color and arrangement.

(*b*) *Music.* — The elementary principles of musical notation, such as an instructor should know in teaching singing in the schools. Ability to sing, while not required, will be prized as an additional qualification.

High School Record.

It may be said, in general, that if the ordinary work of a good statutory high school is well done, candidates should have no difficulty in meeting the academic tests to which they may be subjected. *They cannot be too earnestly urged, however, to avail themselves of the best high school facilities attainable in a four years' course, even though they should pursue studies to an extent not insisted on, or take studies not prescribed, in the admission requirements.*

The importance of a good record in the high school cannot be overestimated. The stronger the evidence of character, scholarship and promise, of whatever kind, candidates bring, especially from schools of high reputation and from teachers of good judgment and fearless expression, the greater confidence they may have in guarding themselves against the contingencies of an examination and of satisfying the examiners as to their fitness.

Equivalents.

A reasonable allowance in equivalents will be made in case a candidate, for satisfactory reasons, has not taken all the subjects named for examination. In determining these equivalents, successful experience in teaching will be taken into account. It should be noted, however, that all the subjects indicated for the admission examinations are of vital importance in the preparation of the teacher for work in the elementary schools. If any are omitted before admission to the normal school, the pupil's work in them after admission is likely to be at some disadvantage.

Examination Dates.

The admission examinations are held at the several normal school buildings, in accordance with the following schedule: —

1902. — Thursday and Friday, June 25 and 26; Tuesday and Wednesday, September 9 and 10.

1903. — Thursday and Friday, June 24 and 25; Tuesday and Wednesday, September 8 and 9.

Examinations for admission to the Normal Art School are held near the end of September, the dates for 1901 being Monday and Tuesday, September 23 and 24.

Preliminary Examinations.

Candidates may be admitted to preliminary examinations a year in advance of their final examinations, provided they offer themselves

in one or more of the following groups, each group to be presented in full: —

II. Mathematics.
III. History and Geography.
IV. Sciences.
V. Drawing and Music.

Preliminary examinations can be taken in June only.

Every candidate for a preliminary examination must present a certificate of preparation in the group or groups chosen, or in the subjects thereof, the form of certificate to be substantially as follows: —

_____ has been a pupil in the _____ School for _____ years and is, in my judgment, prepared to pass the normal school preliminary examination in the following group, or groups, of subjects and the divisions thereof: —

_____

_____

Signature of principal or teacher, _____
Address, _____

The group known as "I. Languages" must be reserved for the final examinations. It will doubtless be found generally advisable in practice that the group known as "IV. Sciences" should also be so reserved.

Candidates for the final or complete examinations are earnestly advised to present themselves, so far as practicable, in June. Division of the final or complete examinations between June and September is permissible, but it is important both for the normal school and for the candidate that the work laid out for the September examinations, which so closely precede the opening of the normal schools, shall be kept down to a minimum.

Times of Admission.

New classes will be admitted at the beginning of the fall term only. The studies of the course are arranged progressively from that time; it is important, therefore, that students shall present themselves then for duty. In individual cases and for strong reasons exceptions to this requirement are permissible, but only after due examination, and upon the understanding that the admission shall be at a time convenient to the school and to such classes only as the candidate is qualified to join.

General Two Years' Course of Study.

This course is designed primarily for those who aim to teach in public schools below the high school grade. It comprises substantially the following subjects: —

1. Psychology, history of education, principles of education, methods of instruction and discipline, school organization and the school laws of Massachusetts.

2. Methods of teaching the following subjects: —

(*a*) English, — reading, language, rhetoric, composition, literature and history.

(*b*) Mathematics, — arithmetic, bookkeeping, elementary algebra and geometry.

(*c*) Science, — elementary physics and chemistry, geography, physiology and hygiene, and the study of minerals, plants and animals.

(*d*) Drawing, vocal music, physical culture and manual training.

3. Observation and practice in the training school and observation in other public schools.

A Third Year for Practice and Study.

The board of visitors and the principal of any normal school may arrange for a third year of study and of practice in teaching for its graduates whenever, in their judgment, such action is desirable. The object of this course is a more complete mastery of the topics arranged for the regular two years' course as well as further work in the practice school. Work in the practice school will be under the direct supervision of a teacher of the normal school or of a teacher specially approved for that purpose. Such a course is already in operation in connection with the Fitchburg Normal School.

Other Courses.

At the Bridgewater Normal School there is a four years' course, which includes the maximum work in the subjects of the two years' course and two years' work in the languages and advanced English studies. It is a distinct course from the beginning.

At Bridgewater, also, there is an advanced course of two years, which graduates of colleges and promising graduates from the regular two years' course are permitted to take. It is designed primarily for those who aim to teach in the public schools above the grammar school grades.

Neither of the two foregoing courses is permissible in the other normal schools without a special vote of the Board to that effect in

the case of each school. An advanced course has been authorized for Hyannis.

In connection with the Framingham Normal School is the Mary Hemenway Department of Household Arts. Its course of study is two years long; its principal aim, to prepare teachers of the various household arts, especially cookery in its various forms, for the public schools. A graduate from the regular normal course of this school may take the household arts course in one year; or a graduate from the household arts course may take the regular normal course in one year.

For details of the foregoing courses apply at the schools where they are given.

The Normal Art School.

Candidates for admission must be at least sixteen years of age, present evidence of good moral character, be graduates of high schools or have received an equivalent training, and pass an examination in the following subjects: —

1. Outline from group of models.
2. Outline ornaments from cast.
3. Light and shade from objects.

The courses of study are three and four years long. They are designed primarily for persons who aim to teach drawing in the public schools. For information about the times and requirements for admission, details of the courses of study and other matters, apply to the principal of the school, corner of Newbury and Exeter streets, Boston.

Diplomas.

For the successful completion of regular courses, diplomas are awarded. These diplomas may be legally accepted by the school committees of the State as evidence of the teaching qualifications of the holders thereof in lieu of the personal examination otherwise required by law.

Certificates for One Year's Study.

Graduates of colleges and universities who give evidence of maturity, good scholarship and of aptness to teach, may, with the consent of the principal of the school and of the board of visitors, select from the general two years' course of study a course which may be completed in one year, and when such course is successfully completed they shall receive a certificate for the same.

Teachers of successful experience, who bring satisfactory testimonials, may also receive a certificate under similar conditions.

So, too, persons of exceptional maturity, of high standing in college, and who give evidence of special aptness to teach, may receive a certificate for one year's study of subjects selected from the two years' advanced course of the Bridgewater Normal School.

Summer Session of the Hyannis Normal School.

At the Hyannis Normal School a summer session of five weeks is held. This session is entirely distinct from the regular sessions of the school, and is intended particularly for teachers in the service who feel the need of further training. The work is of an intensive character and counts towards the diploma of the school. Tuition is free to Massachusetts teachers. For details apply to the principal of the school.

Health of Candidates and Students.

The State Board of Education adopted the following vote March 7, 1901: —

That the visitors of the several normal schools be authorized and directed to provide for a physical examination of candidates for admission to the normal schools, in order to determine whether they are free from any disease or infirmity which would unfit them for the office of teacher, and also to examine any student at any time in the course, to determine whether his physical condition is such as to warrant his continuance in the school.

Other Information.

The normal schools at Bridgewater, Westfield, Framingham and Hyannis are provided with dormitories where students may receive board at cost. The normal school at Worcester has a dormitory, but does not furnish board; this, however, may be easily obtained in the immediate neighborhood.

With the exception of the Framingham School, which is for young women only, the privileges of each normal school are offered to young men and women alike.

Tuition is free to students from Massachusetts who declare their intention to teach in the State. For students from other States and countries the charge is one hundred dollars a year in the Normal Art School and fifty dollars a year in each of the remaining normal schools, of which one half is payable at the beginning of the first half-year session and one half at the beginning of the second half-year session.

Text-books and supplies are free, as in the public schools.

State aid to a limited extent may be granted to deserving persons after they have been in attendance for at least one term, provided

they do not live in the towns where the normal schools are situated.

A circular entitled "To one who wishes to become a teacher" may be had upon application to the secretary at the State House.

For catalogues, specimen examination questions for admission, blanks for the various certificates required, and such additional information as may be sought, apply directly to the principals of the several schools.

FRANK A. HILL, *Secretary*.

In the Service of the Commonwealth.

STATE BOARD OF EDUCATION.

STATE HOUSE, BOSTON, September, 1901.

☞ *Principals of schools and others whom this circular may reach are requested to bring it to the notice of young people who wish to become teachers. Such persons should be found out, if possible, at the beginning of their high school course, and wisely advised about their plans of work. Copies of this circular may be obtained upon application to the Secretary at the State House.*

TO ONE WHO WISHES TO BECOME A TEACHER.

MY YOUNG FRIEND: — May I advise you a little about preparing yourself for your chosen work? You are thinking, perhaps, how you can best earn a livelihood. I am thinking chiefly how you can help the schools. Really, however, the interests of the teacher and those of the school run together. The better the teacher, the better the school; and the better the school, the greater the prosperity of the teacher.

Interests of teacher and school the same.

If there were some way in which the State could intelligently select its own candidates for teaching, the schools would fare better than they do now. She would take some that do not now dream of teaching and decline some that now select themselves. Whether in deciding to become a teacher you have chosen wisely or not, I do not know. But now that your choice is made, you owe it both to your future pupils and to yourself to become as good a teacher as possible. You need, in short, to train yourself for your work.

Wisdom of choice.

It is true there are good teachers who have not been normally trained; it is also true there are poor teachers who have been normally trained. This leads me to say that if you attend a normal school, it does not follow that you will become a successful teacher. This is because so much of what is essential to success is a matter of happy native endowment, and, therefore, not in the power of the normal school to give. Physique, presence, health, temper, scholarly power, tact, patience, ambition, moral spirit, lovableness, — the basis of all these things comes not from schools but from ancestry and surroundings. This foundation wanting, no normal school can make it good. This foundation present, you can, with the aid of the normal school, build more rapidly and securely upon it than would otherwise be possible. The normal school will give

What the normal school can do and what it cannot do.

you a quicker insight into the nature of education, put you earlier upon right methods, save you from many mistakes, — in short, furnish you with the great lessons that have come from the study of the teaching process and from the history of teaching in the past; for you need as a teacher to begin where the successful experience of the world has left off. It is a clear waste for you to spend years in discovering what is already known. Moreover, you have no right to gain at the expense of your pupils what you should gain beforehand at your own expense.

General academic training needed.

If your aim is to teach in some grade below the high school, you need, before going to a normal school, a good high school training, — as good a training as the best high school, with the best teachers and the best equipment, can give you in a four years' course. A still more extended training would be helpful, for I cannot conceive of a discipline so thorough, of attainments so great, of culture so high, but that all these things may have some precious value even in teaching little children. If, however, it is your aim to teach in a high school, neither you nor the high school should be content with any academic preparation that falls short of a good four years' college course.

Should you enter upon the general two years' course of a normal school, the work it will try to do for you may be roughly sketched under the following heads: —

The principles of teaching.

1. It will aim to unfold to you the principles of teaching as drawn from the laws of mental activity and exemplified in the teaching experience of the world. This aim involves the study of educational psychology and educational history.

Why previous academic knowledge of subjects to be directly taught is needed.

2. It will aim to show you how these principles may be applied in elementary instruction. This aim requires (1) that you shall be familiar with the subjects of instruction before you enter the normal school, and (2) that you shall take them up again from the teacher's standpoint and study critically how to develop them with children in accordance with sound principles. To the extent to which your energies are absorbed in conquering elementary subjects that should have been mastered before admission there is a loss not only to yourself but to the normal school and to the schools of the State. It is a distinct loss, for instance, if the normal school is called upon to teach you percentage when it is your duty to know percentage before you enter it. The normal school does not aim to teach percentage to you, but to guide you in teaching percentage to others. It should start from your intelligence, not from your ignorance. It wants your energies for the science and

art of presentation, not for the conquest of what should already be known.

3. The normal school will try to show you what education really is, — that it creates nothing new, that it builds on nature, that it is development under guidance, that it has continuity, and that a close and vital connection, therefore, exists between primary instruction and all that comes after it. In other words, the great highways of knowledge and training begin with the lowest grade and run through the highest, so that, if you wish to meet modern demands, it is no longer reading, writing, and arithmetic that you must teach, but the world that is about the child and the great laws or thoughts of that world. These thoughts the child must be led to grasp and express, not in their fulness, for that would be beyond him; not all of them or most of them, for that, too, would be impossible; but a few of them, such as suit his years and enlist his interest, so that they may become, as it were, nuclei or axes or centres of a growth that is worth fostering. But how can you put little children on the track of these great thoughts unless you know the field where you profess to be a guide? If you are teaching children about plants, it is not enough to use an isolated rose, for instance, as the basis for training the powers of observation, inference, and expression. This is good so far as it goes; but if, in addition, you can lead the child into some insight, however dim, of the principles that shall help him to bring the separate objects of his nature study into orderly groups, — that shall lead him, for instance, to see the rose idea in the blossoms of the apple-tree and the bramble as well as in those of the rosebush, — and that, while engaging his young intellect, shall rightly kindle his soul, — then your teaching is of a higher order. Now the normal school wants you to come to its classes with a good high school acquaintance with botany, that it may be unhampered and free in guiding you (1) to the right use of such knowledge as you have in teaching plants as single objects to children, and (2) to such wider and deeper views of the plant world as children may properly make a beginning of apprehending, and to feasible ways of laying the foundations for such views in their immature minds. If your ignorance of botany compels the normal school to teach you the elements of that subject, it forces the normal school to do work that really belongs to the schools below; and to that extent the normal school is diverted from its true aims, and its usefulness for you and for others is seriously crippled.

Why previous academic knowledge of some subjects not to be directly taught is needed.

The same reasoning may be extended to other subjects than botany.

4. Further, there is the general administration of a school, — all that relates to neatness, order, discipline, health, manners, morals,

the requirements of good citizenship, and, in general, to one's making the best and most of one's self in life. The normal school recognizes two classes of agencies that are potent in the schoolroom, the one relating to the externals of school management and the other to the atmosphere or spirit of that management; the one as exhibited in intelligent direction of the school, or in what the teacher consciously does, and the other in silent influence exerted upon the school, or in what the teacher unconsciously is. Agencies of the former class bear analysis; they can be directly learned. Agencies of the latter class baffle analysis; they are strong only as the aim is sound, the heart right and the life earnest. Now the aim of the normal school is to expound to you the one class and to foster in you the growth of the other; and the high purpose of its teachers is to be themselves what they would have you be, — intelligent in directing and noble in living.

Agencies in school management.

5. Finally, however helpful it may be for you to study the principles and methods of teaching in a theoretical way, this is not enough. The normal school, therefore, in its observation and training schools, aims to give you facilities not only for seeing competent teachers at work with children, but also for teaching children yourselves under competent supervision. As the very object of normal instruction is to reduce the burdens and losses that come to the public schools from the employment of untrained teachers, the normal school aims to guard its own training schools against similar burdens and losses by putting them under the general and permanent supervision of able teachers, as well as by declining to let its pupils practice in them until they have received instruction enough to work with definiteness and intelligence of aim and method.

Observation and training schools.

Beneath these five respects in which the normal school will try to aid you, there runs, as already intimated, a deep philosophy which it is the business of the normal school to make known to you. If you once grasp this philosophy, if you are qualified to live up to it, if you try to make your practice conform to it, you may hope to hold your course fairly true through the varied and often shifting and treacherous problems of teaching and of school management.

Philosophy of teaching.

With this conception of the service the normal school would like to do for you in your preparatory work, you will, I hope, discover ways in which you can do a similar service for yourself before entering the normal school. While you are in the high school, for instance, there is much helpful work possible for you beyond the letter of high school requirements. Why not begin early to do such work? While you are a pupil, it would be well for you to think of yourself at times as

a teacher, so that in discharging your duty in the humbler rôle you may rise to certain ideals of duty in the higher. Are you doing oral work of any kind, — demonstrating a theorem in geometry, explaining a principle in physics, translating French or Latin, answering a teacher's questions? The thought, of course, takes precedence always. But there are standards of voice, of fulness, completeness and accuracy of expression, of manner of presentation, of aim in satisfying others, which, if kept before you and striven for, will tend to lift your work from the commonplace and make it thus early what it should be later, — a means of molding others by the unconscious power of example. Are you doing written work in connection with any subject? Here, too, there are standards of accuracy and finish to be kept in view. There is no better way of keeping your English steadily under review than in close, everyday attention to its details of spelling, syntax, capitalization, punctuation, paragraphing, and the like. An excellent authority goes so far as to say "that the desire to make every word and letter plain consorts naturally with the desire to make the thought plain, and slovenliness in the one begets slovenliness in the other." If this is true of one's handwriting, much more is it likely to be true of details that come still closer to the thought.

Ideals to be kept in mind while in the high school.

In the next place, plan to do some of your school work in permanent and attractive form, partly that it may serve as evidence of successful high school work when you apply for admission to the normal school, but chiefly because doing it in such form is inspiring both to yourself and to those that examine it. The teacher more than most people needs to do work in good form because there are so many to be influenced by whatever example he sets. I refer to your laboratory notebooks, to your drawing books, to your books of composition or other exercises in English, to articles with or without illustration which you may prepare in connection with any scholarly investigation, to your personal collections of plants, minerals, chemical products and what not, — in short, to any evidences of scholarly power or personal skill that are susceptible of presentation to the eye.

Permanent and attractive forms of high school work.

Finally, if you are fortunate in working under an able and sympathetic principal or other teacher who approves your plan and would like to help you carry it out, you might, under his advice and direction, do many things that come more closely within the range of a teacher's duty and yet are useful to you as a pupil. There is the correction or supervision of certain school exercises; there is the lending of a helping hand to pupils who need guidance; there is the explanation of matters, from a teacher's standpoint, to a class; and so

Union of student service with teaching service.

on. Services like these give you new views of old things and newly test your mental prowess. If you are really "called" to teach, you should discover in yourself a readiness, at least, if not an impelling force or passion, to do some work in the line of your calling before you formally enter upon it.

In all your high school work there is a certain push, a certain spirit to make the most of the passing opportunity, a certain intellectual forwardness that is yet consistent with modesty, which I strongly commend to you. It is more than mere conformity to average school requirements; it is responding early to some demands that are sure to be made upon you later when you are in charge of a school, — demands for self-reliance, originality, leadership, and so on.

Evidences of fitness.

While the evidence of your fitness to receive normal training has to be sought, of course, in your school record, in what may be learned of your personality, and in your scholarly power as seen in your treatment, both oral and written, of a few themes selected from subjects once studied by you, the fitness itself, if it exists, must exist apart from schemes of examination. Therefore do not work merely to meet anticipated questions, but aim always for mastery and power in whatever you do. As between excellence in a narrow field and mediocrity in a broad one, if you must choose between them, choose the former.

Preparatory work outside of school.

Study carefully the circular of requirements for admission. It is not intended to ask for more in these requirements than the public schools are required by law to offer. Nevertheless, conditions may require you to supplement the work of the school by work outside. If, for example, the books prescribed for use in English cannot all be taken in school, read some of them out of school. There is much, also, of what you did in the grammar school, in geography, arithmetic, and other subjects, for whose review you should hold yourself personally responsible. Review United States history by reading some standard work on the subject. Some practice in self-teaching when other teaching fails you is good for you. The State wants sturdy, self-reliant teachers, that are not easily cast down themselves, to hold pupils up to similar sturdiness and self-reliance.

Preparation for short service.

Perhaps you do not expect to teach long, and so question the wisdom of special preparation. Whether you teach a long time, a short time, or not at all, the training of the normal school is good for the general purposes of education as well as for the specific purposes of teaching. In any event, the need of the schools for trained teachers, whether you recognize it or not, remains constant and urgent.

It may be that you live in a town or city that has a local training school for teachers, and that your only avenue to appointment, if you wish to teach at home, lies through this school. Even if you are indulgently permitted to enter this school directly from the high school, it would nevertheless be better for you to attend a normal school first.

Local training schools for teachers.

One reason for maintaining such schools is doubtless found in the earnestness of school authorities to discover who of numerous applicants for appointment are likely to serve them best. If this is the case you are more likely, other things being equal, to do good work in the local training school if you enter it with previous normal school experience than if you enter it without such experience; and this means for you a greater likelihood of timely appointment as a teacher and for the schools a greater likelihood of satisfactory service from such appointment.

Under no circumstances have you a just claim to be employed as a teacher except that which fitness to do the work of a teacher gives you. Other claims than those of fitness no school board has a moral right to respect. If such fitness exists, there is not only room for you but there is a pressing demand for you in the schools of the Commonwealth.

Fitness the teacher's only claim to consideration.

Although it would be premature for you to enter upon a course of professional reading while in the high school, yet a preliminary glimpse of what is needed in the teacher — such a view as you might get, for instance, from some portions of such books as Page's "Theory and Practice of Teaching," or White's "School Management," or James's "Talks to Teachers on Psychology: and to Students on Some of Life's Ideals" — might give you invaluable aid as to the color and tone your high school work should receive from your purpose to become a teacher. It may be that you are mature and thoughtful enough to profit by some of Emerson's essays. If so, try those on Power, Culture, Manners, Behavior, Self-Reliance and Spiritual Laws.

Certain reading advised.

Sincerely hoping that your choice of teaching as a profession has been wisely made, I wish you success and joy in the important work of preparing for it.

FRANK A. HILL, *Secretary.*

Examination for Admission to the Massachusetts State Normal Schools, June 25 and 26, 1896.

I. LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. *Let careful attention be given to spelling, punctuation, capitalization, syntax, paragraphing and idiom.* Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Shakespeare's *Midsummer Night's Dream;* Defoe's *History of the Plague in London;* Irving's *Tales of a Traveller;* Scott's *Woodstock;* Macaulay's *Essay on Milton;* Longfellow's *Evangeline;* George Eliot's *Silas Marner.*

Mention other works in literature that you have also read.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear and correct way.

(*a*) Some account of *one only* of the following writers: Shakespeare, Scott, Longfellow.

(*b*) Either Bottom or Puck, in *Midsummer Night's Dream.*

(*c*) Either Louis Kerneguy or the Commissioners, in *Woodstock.*

(*d*) Either the story of *Evangeline* or the verse of the poem.

(*e*) How Eppie came to live with Silas Marner.

(*f*) Two or three of Macaulay's statements or opinions about Milton.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other written work done in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

Study and Practice.

3. Tell what books of the following list you have critically studied: Shakespeare's *Merchant of Venice;* Milton's *L'Allegro, Il Penseroso, Comus and Lycidas;* Webster's *First Bunker Hill Oration.*

4. Comment on *one only* of the passages (*a*), (*b*), (*c*) and (*d*) that follow, limiting yourself to the points suggested:

(*a*) I speak too long; but 'tis to peize the time,
To eke it, and to draw it out at length,
To stay you from election.

Points to be treated: The occasion; the speaker; the person addressed; the emotion that prompted the speech; the meaning of the words *peize*, *eke* and *stay;* the election referred to.

(*b*) Straight mine eye hath caught new pleasures,
Whilst the landscape round it measures;
Russet lawns, and fallows gray,
Where the nibbling flocks do stray;
Mountains on whose barren breast
The labouring clouds do often rest;
Meadows trim with daisies pied,
Shallow brooks, and rivers wide.

Points to be considered: A list of the *new pleasures*, each being indicated by a single word; whether *it* is the object of *round* or the subject of *measures*, with reasons for your opinion; the case of *landscape*, with the reason; what the poet means by *russet lawns* and *fallows gray;* the poet's reasons for using the words *barren* and *labouring.*

(*c*) Explain these allusions in Webster's *First Bunker Hill Oration:*

(1) But ah! Him! The first great martyr in this great cause!

(2) Veterans of half a century!

(3) Fortunate man! You are connected with both hemispheres and with two generations.

(4) "Serus in coelum redeas."

(*d*) 'Twill not restore the truth and honesty
That thou hast banished from thy tongue with lies.
Was this the cottage and the safe abode
Thou told'st me of? What grim aspects are these,—
These ugly-headed monsters? . . . . .
Were it a draft for Juno when she banquets
I would not taste thy treasonous offer.

Points: At the discretion of the candidate.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *The oracle at Delphi advises the Athenians in view of the invasion of Xerxes.*

Translate into English: Cuius de adventu cum fama in Graeciam esset perlata et maxime Athenienses peti dicerentur propter pugnam Marathoniam, miserunt Delphos consultum, quidnam facerent de rebus suis. Deliberantibus Pythia respondit ut moenibus ligneis se munirent. Id responsum quo valeret cum intellegeret nemo, Themistocles persuasit consilium esse Apollinis, ut in naves se suaque conferrent: eum enim a deo significari murum ligneum.

(1) Reason for the mode and tense of *esset perlata?*

(2) Principal parts of *conferrent?*

(3) Where is *consultum* made?

(4) If the clause *ut moenibus ligneis se munirent* is regarded as a substantive, in what case is it and why?

The candidate may omit questions (1), (2), (3) and (4) and answer only (5).

(5) *Translate into Latin:* News is brought to Delphi that Xerxes is about to lead his forces into Greece and that the Athenians do not know what to do about their affairs.

(*b*) *Dido welcomes the Trojans to Carthage.*

Solvite corde metum, Teucri, secludite curas.
Res dura et regni novitas me talia cogunt
moliri, et late finis custode tueri.
Quis genus Aeneadum, quis Trojae nesciat urbem
virtutesque virosque, aut tanti incendia belli?
Non obtusa adeo gestamus pectora Poeni,
nec tam aversus equos Tyria Sol iungit ab urbe.
Seu vos Hesperiam magnam Saturniaque arva,
sive Erycis finis regemque optatis Acesten,
auxilio tutos dimittam, opibusque iuvabo.
Voltis et his mecum pariter considere regnis;
urbem quam statuo, vestra est; subducite navis;
Tros Tyriusque mihi nullo discrimine agetur.

Aeneid I., 561–574.

FRENCH.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on.

2. *Translate into English:*

MARIE ANTOINETTE.

La reine semblait avoir été créée par la nature pour contraster avec le roi, et pour attirer à jamais l'intérêt et la pitié des siècles sur un de ces drames d'état qui ne sont pas complets quand les infortunes d'une femme ne les achèvent pas. Fille de Marie-Thérèse, elle avait commencé sa vie dans les orages de la monarchie antrichienne. Elle était sœur de ces enfans que l'impératrice tenait par la main quand elle se présenta en suppliante devant les fidèles Hongrois, et que ces troupes s'écrièrent: "Mourons pour notre roi Marie-Thérèse!" Sa fille aussi avait le cœur d'un roi. A son arrivée en France, sa beauté avait ébloui le royaume; cette beauté était dans tout son éclat. Elle était grande, élancée, souple; une veritable fille du Tyrol.

Lamartine.

3. *Translate into French:* Are not these the children of the empress? Does she not grasp them by the hand?

GERMAN.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on.

2. *Translate into English:*

PESTALOZZI.

Dieser Mann war ein grosser Kinderfreund und hatte lange Zeit in seinem Hause viele arme Kinder; diese unterrichtete und erzog er, wie wenn sie seine eigenen Kinder gewesen wären. Er war nicht reich und war immer altmodisch gekleidet. Einmal ging er nach Basel.[1] Da begegnete ihm ein armer Mann und klagte ihm, dass er viel Unglück in seinem Hause gehabt habe; jetzt wisse er sich gar nicht mehr zu helfen und bitte ihn um eine milde Gabe. Pestalozzi hatte kein geld im Sacke, aber der arme Mann dauerte ihn so, dass er sich niederbückte eine von seinen silbernen Schuhschnallen losmachte und sie dem armen Manne gab.

3. *Translate into German:* No man loves children more than Pestalozzi. He trains them as if they were his own.

[1] The city of Basle.

Examination for Admission to the Massachusetts State Normal Schools, June 25 and 26, 1896.

II. MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. If the ratio of a yard to a meter is as .914383 to 1, what is the ratio of an inch to a centimeter?

2. A room 21 feet long and 18 feet wide is to be laid with carpeting $\frac{5}{4}$ of a yard wide. Is it better to have the breadths run the long way of the room or the short way, and why? What will be the cost of the carpeting at $1.50 per yard, if there is no waste in matching the pattern?

Take either 3 or 4.

3. A man bought 50 barrels of flour for $4.50 per barrel and sold it immediately at $5.00 per barrel on three months' credit If the note for the amount of the sale were discounted immediately at a bank at 6%, what would be the gain in the transaction?

4. The sum of the sides of an isosceles triangle is 16 inches. One of the equal sides is 5 inches. What is the area of the triangle in square inches?

ALGEBRA.

Take either 1 or 2.

Reduce the following expression to its simplest form: —

$$\frac{(a+b)\,b}{a-b} + \frac{5\,ab - b^2}{b-a} + \frac{2\,a^2}{a-b}$$

2. Simplify the following: —

$$16 - x - \left\{ 7x - [8 - 9x - (3 - 6x)] \right\} + 21$$

Take either 3 or 4.

3. A certain number is divided by b. The sum of the quotient, the divisor and the dividend is a. What is the number?

4. Find the value of x only in the following equations, eliminating y by comparison: —

(1) $\frac{1}{x} + \frac{1}{y} = 6$

(2) $\frac{2}{x} - \frac{1}{y} = 0$

Take either 5 or 6.

5. The product of two numbers is a and their sum b. What are the numbers?

6. The formula for the amount yielded by a principal at simple interest for a given time and rate is $a = p + prt$.

(*a*) Find p from this formula.

(*b*) Express in words the truth expressed in the formula for p.

(*c*) With the aid of the formula, find what principal in three years at 4 per cent. will amount to $448.

GEOMETRY.

Take either 1 or 2.

1. Prove that any point in the bisector of an angle is equally distant from the sides of the angle.

2. Prove that the line dividing two sides of a triangle proportionally is parallel to the third side.

Take either 3 or 4.

3. Prove that a diameter is greater than any other chord of a circle.

4. A regular polygon inscribed in a circle has its number of sides indefinitely increased.

(*a*) What are the limits respectively of the apothem and the perimeter of the polygon and of the polygon itself?

(*b*) The area of the polygon is equal to what?

(*c*) The area of the circle is equal to what?

(*d*) Give the theorem or principle by means of which the area of the circle is obtained from that of the polygon.

Take one only of 5, 6 and 7.

5. Show with the aid of a diagram how a circumference may be passed through three points not in a straight line.

6. Let x represent the altitude of an equilateral triangle one of whose sides is a. Find x in terms of a.

7. (*a*) Inscribe the triangle ABC in a semicircle, AC being the diameter. Let fall a perpendicular BD from the vertex B to the diameter. Find BD, representing it by x, when AD is 9 and DC is 4.

(*b*) What is the locus of the vertex of the right angle of a right triangle that is constructed on a given hypothenuse?

Examination for Admission to the Massachusetts State Normal Schools, June 25 and 26, 1896.

III. HISTORY AND GEOGRAPHY.

Take pains with your English. Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one only of 2, 3, 4 and 5.

2. **MASSACHUSETTS.**

(*a*) The difference in religious views between the Pilgrims and the Puritans.

(*b*) Causes in England that led to the Puritan exodus to Massachusetts.

(*c*) The change from the colonial government to the provincial, — the time of it, the causes that led to it, and the attitude of the people towards it.

(*d*) Illustrations to show how geographical conditions have determined the settlement and development of towns or cities in the State.

(*e*) Illustrations of the exercise of local, state and national authority within your town or city.

3. **THE MISSISSIPPI VALLEY.**

(*a*) A comparison of the French and the English claims to this valley in respect to their priority and nature.

(*b*) The side taken by the Indians in the controversies about this valley and their reasons for taking it.

(*c*) The disposition of this vast territory by the treaty of Paris in 1763.

(*d*) The Louisiana purchase.

(*e*) States of the Union formed from this purchase.

4. **THE CIVIL WAR.**

(*a*) The geographical limits of the Southern Confederacy.

(*b*) The blockade, — its object, extent and results.

(*c*) The treatment of slavery at the beginning of the war and as the war progressed.

(*d*) The control of the Mississippi, — by what events secured and of what strategic value.

(*e*) Things settled by the war.

5. **HISTORICAL ALLUSIONS.**

(*a*) The Charter Oak.

(*b*) Mason and Dixon's line.

(*c*) Old Ironsides.

(*d*) The Missouri compromise.

(*e*) Squatter sovereignty.

(*f*) The Dred Scott decision.

(*g*) The Trent affair.

(*h*) The Geneva award.

(*i*) Sheridan's ride.

(*j*) The Alaska purchase.

Examination for Admission to the Massachusetts State Normal Schools, June 25 and 26, 1896.

IV. SCIENCES.

Answer *one question only* under each science. Take pains with the quality of your work, aiming for good English as well as for intelligent and correct statements. Time allowed for the entire paper, two hours.

PHYSICAL GEOGRAPHY.

Take one only of 1, 2 and 3.

1. Write about watersheds and their relations to the size, length, current and commercial availability of rivers. Give an illustration.

2. Make a cross section to show the grander relief forms of North America from the Atlantic to the Pacific. Describe it. In what general way does it differ from a similar cross section for South America?

3. Write about the phenomena of a storm centre, — why it is so called, the condition of the air in it, the readings of the barometer there, its movement, the winds about it, etc.

PHYSIOLOGY AND HYGIENE.

Take one only of 1, 2 and 3.

1. Trace the course of the blood from the left ventricle (where it is impure) back to the left ventricle again, alluding to the vessels

through which it passes, its purity or impurity in them, the places where changes of condition occur and the general cause of each change. Illustrate with a diagram, if you can.

2. Make three statements about the lungs, the first of which shall be anatomical, the second physiological, and the third hygienic.

3. Write about the nervous system under the following heads:—

(*a*) The service rendered by it.

(*b*) The distinction between a voluntary and a reflex movement, with illustrations.

(*c*) The influence of alcohol upon the power of self-control and the possible consequences thereof.

PHYSICS.

1. State whether in your study of physics you have performed experiments and kept a notebook; and if so, to what extent.

Take one only of 2, 3 and 4.

2. Write about the barometer under the following heads:—

(*a*) Its construction, with a diagram.

(*b*) Why the mercury is sustained in the tube.

(*c*) The height at which water would stand in a barometer if mercury, under the same conditions, would stand at 30.25 inches (specific gravity of mercury, 13.6).

(*d*) Fluctuations in the height of the mercury and the causes thereof.

3. Define and illustrate the following: (*a*) work; (*b*) energy; (*c*) potential energy; (*d*) kinetic energy; (*e*) transformation of energy.

4. With the aid of a diagram to show the working either of the apparatus or of the principle involved in it, describe one only of the following: the electric telegraph, the electric motor, the Bell telephone.

CHEMISTRY.

1. State whether in your study of chemistry you have performed experiments and kept notebooks; and if so, to what extent.

Take one only of 2, 3 and 4.

2. Write upon oxidation under the following heads: —

(*a*) How rapid oxidation compares with slow in respect to light, heat and products.

(*b*) Some products of combustion, with their symbols

(*c*) The cause of incandescence in combustion.

(*d*) The cause of spontaneous combustion.

(*e*) The arrest of decay in organic substances.

3. (*a*) Name each of the following: K_2SO_4, H_2SO_4 KHO, HNO_3, Ca CO_3.

(*b*) Write symbols for the following: ammonia, limestone, common salt, copper sulphate, copper nitrate.

(*c*) Write the chemical equation for the reaction that occurs when sulphuric acid is added to marble.

(*d*) How many pounds of silver nitrate can be made from five pounds of silver (Ag, 107.1; N, 14; O, 16)?

4. Write upon carbon dioxide under the following heads: —

(*a*) Its solubility in water.

(*b*) How it can be made liquid or solid.

(*c*) An experiment to test its presence in air issuing from the lungs.

(*d*) Processes that are continuously adding vast quantities of it to our atmosphere.

(*e*) Processes that keep the atmosphere uniform and pure in spite of such additions.

BOTANY.

1. To what extent has your study of botany been objective? Have you examined structures, performed experiments, made analyses, collected specimens, kept notebooks, etc.? If so, to what extent?

Take one only of 2, 3 and 4.

2. Suggest experiments with germinating seeds to show the following: —

(*a*) That light favors germination.

(*b*) That moisture favors it.

(*c*) That air favors it.

(*d*) That temperature affects it.

3. Give the names (*a*) of one or two dicotyledonous plants, and (*b*) of one or two monocotyledonous plants. (*c*) Distinguish between the two kinds in respect to the structure, the growth and the life or vitality of the stem.

4. Describe the flower submitted to you for examination, arranging your description under the following heads and using botanical terms to bring out the principal characteristics of each part: —

(*a*) The calyx.

(*b*) The corolla.

(*c*) The stamens.

(*d*) The pistil.

(*e*) How it compares with the typical flower in respect to being complete, perfect, regular and symmetrical.

Examination for Admission to the Massachusetts State Normal Schools, June 25 and 26, 1896.

V. DRAWING AND MUSIC.

The candidate will take both Drawing and Music. Time for the entire paper, one hour.

DRAWING.

1. Circle, sphere, square prism, cube, oblong, ellipsoid, triangular prism, ovoid, pyramid, cone, isosceles triangle, circular plinth, spheroid, ellipse, oval.

(*a*) Select from the foregoing list the names of the geometric solids and write them in order.

(*b*) Arrange the remaining names in a column and sketch opposite each the corresponding geometric figure.

Take one only of 2, 3 and 4.

2. Rule an oblong 3½″ wide and 5″ long, the long edges horizontal. Suppose that this oblong represents the floor of a kindergarten room 14′ × 20′. Indicate by drawing a circle to the proper scale the position of a ring 8′ in diameter, painted upon the floor in such a position that at three points it is 3′ from the edges of the floor.

3. Sketch lightly, freehand, a four-inch square, judging the dimensions. Sketch a diagonal; trisect it. Sketch another diagonal; trisect it. Quadrisect each side of the square. Sketch the necessary oblique lines and line-in to form a Maltese cross.

4. Make a drawing of a natural leaf from the object. Make a conventional drawing of the same.

Take 5 or 6, but not both.

5. Sketch, either from the object or from memory, stating which, a cube placed below the level of the eye and turned so that three faces are visible.

6. Sketch from the object a book below the level of the eye, resting upon its side and turned at an angle.

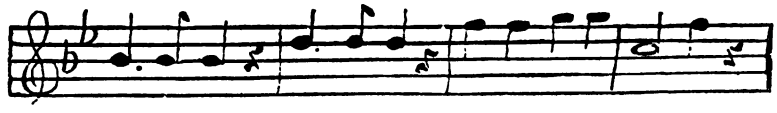
MUSIC.

1. Do you read music or sing or play a musical instrument? Give some account of such musical training as you may have received.

Take 2 or 3, but not both.

2. Write on a staff four measures in four-four time, using notes, dots and rests as values. Write the treble or G clef and place figures properly on the staff to indicate the time.

3. Copy the following, and give (*a*) its signature, (*b*) its key, (*c*) its measure, (*d*) the scale names of its notes in order, and (*e*) the pitch names of its notes in order:



Examination for Admission to the Massachusetts State Normal Schools, September 8 and 9, 1896.

I. LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. *Let careful attention be given to spelling, punctuation, capitalization, syntax, paragraphing and idiom.* Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Shakespeare's *Midsummer Night's Dream*; Defoe's *History of the Plague in London*; Irving's *Tales of a Traveller*; Scott's *Woodstock*; Macaulay's *Essay on Milton*; Longfellow's *Evangeline*; George Eliot's *Silas Marner*.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear and correct way.

(*a*) Either of the following:
The Search for Gabriel.
The Ending of the Story of Evangeline.

(*b*) Either of the following:
Titania and Bottom.
The Play of Pyramus and Thisbe.

(*c*) Either of the following:
The Money Diggers.
The Golden Dreams of Wolfert Webber.

(*d*) Either of the following:
Silas Marner's Gold.
The Coming of Eppie.

(*e*) Either of the following:
The Times described in Woodstock.
Cromwell and the Portrait of Charles I.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other written work done in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

3. Tell what books of the following list you have critically studied: Shakespeare's *Merchant of Venice*; Milton's *L'Allegro*, *Il Penseroso*, *Comus and Lycidas*; Webster's *First Bunker Hill Oration.*

4. Comment on *one only* of the passages (*a*), (*b*), (*c*) and (*d*) that follow, limiting yourself to the points suggested:

(*a*) The quality of mercy is not strained;
It droppeth as the gentle rain from heaven
Upon the place beneath . . . .

Points to be treated: The speaker, the person addressed, the circumstances, the drift and purpose of the speech of which the above words are the beginning, the meaning of the first line, the effect on the person addressed, the character of that person as revealed in his reception of the appeal.

(*b*) Quote from *Comus* some passage that you like and show its relation to the context. If unable to do so, comment upon the following:

Nay, lady, sit; if I but wave this wand,
Your nerves are all chain'd up in alabaster,
And you a statue; or, as Daphne was,
Root-bound, that fled Apollo.

(*c*) Webster's *First Bunker Hill Oration*, — the occasion, and how the address reflected it.

(*d*) Alas! what boots it with incessant care
To tend the homely, slighted, shepherd's trade,
And strictly meditate the thankless Muse?
Were it not better done, as others use,
To sport with Amaryllis, in the shade,
Or with the tangles of Neaera's hair?
Fame is the spur that the clear spirit doth raise
(That last infirmity of noble minds)
To scorn delights and live laborious days;
But the fair guerdon when we hope to find,
And think to burst out into sudden blaze,
Comes the blind Fury with the abhorred shears
To slit the thin-spun life.

Points to be treated: The event that inspired the lines; the meaning of *boots it* and *meditate the thankless Muse*; the two kinds of life contrasted in the first six lines; whether *spirit* is the subject or the object of *raise*; *guerdon*, — its meaning and reference; the allusion in *Fury*; the poet's reasons for using the epithets *blind* and *thin-spun.*

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Translate into English:*

Hannibal, Hamilcaris filius, novem annos natus, a patre aris admotus odium in Romanos perenne juravit. Quae res maxime videtur concitasse secundum bellum Punicum. Nam Hamilcare mortuo Hannibal, causam belli quaerens, Saguntum, urbem Romanis foederatam, evertit. Quapropter Roma missi sunt Carthaginem legati, qui populi Romani querimonias deferrent, et Hannibalem, mali auctorem, sibi dedi postularent. Tergiversantibus Poenis, Q. Fabius, legationis princeps, sinu ex toga facto: "Hic ego," inquit, "porto bellum pacemque; utrum placet, sumite." Poenis "bellum" succlamantibus, Fabius, excussa toga,[1] bellum se dare dixit. Poeni accipere se responderunt, et quo acciperent animo, eodem se gesturos.

[1] *A Roman gown worn in time of peace.*

(1) Explain the case of *aris, Roma* and *Carthaginem.*

(2) Explain the mood of *deferrent.*

(3) *Translate into Latin:* The Romans send Fabius to Carthage to demand that Hannibal be given up to them. The Carthaginians say they will not give him up.

(*b*) *Translate into English:*

Extemplo Libyae magnas it Fama per urbes —
Fama, malum qua non aliud velocius ullum;
mobilitate viget, viresque adquirit eundo,
parva metu primo, mox sese attollit in auras,
ingrediturque solo, et caput inter nubila condit.
Illam Terra parens, ira inritata deorum,
extremam (ut perhibent) Coeo Enceladoque sororem
progenuit, pedibus celerem et pernicibus alis,
monstrum horrendum, ingens, cui, quot sunt corpore plumae,
tot vigiles oculi subter, mirabile dictu,
tot linguae, totidem ora sonant, tot subrigit aures.
Nocte volat coeli medio terraeque per umbram,
stridens, nec dulci declinat lumina somno;
luce sedet custos aut summi culmine tecti,
turribus aut altis, et magnas territat urbes;
tam ficti pravique tenax, quam nuntia veri.

Aeneid, IV., 173–188.

FRENCH.

1. *Translate into English:* Eh bien, voyons, chevalier, n'avez-vous rien à dire, vous, et nous laisserez-vous ainsi dans l'embarras?

Le pauvre chevalier trembla de la tête aux pieds. Lui, parler en public, quand un mot, un regard, un salut le jetaient dans un trouble inexprimable! Que faire? car il se croyait obligé de parler, et sa conscience, profondément naïve et généreuse, le lui ordonnait. Il se recueillit un instant, monta sur les marches du monument, essuya son front baigné des sueurs de l'angoisse, et parla ainsi d'une voix entre-coupée:

Mesdames et messieurs, si j'ai la hardiesse de prendre la parole devant vous, moi le plus incapable de bien dire, c'est parce que la reconnaissance m'en fait un devoir et que je compte sur votre indulgence. Mon langage sera rustique et simple, mais mon cœur parlera. Je crois que fort peu d'entre vous ont été en relation avec celui qui repose ici, et je dois vous avouer que, pour ma part, bien que vivant fort près de lui, je ne l'ai jamais vu de près. Telle était sa volonté; mais j'ai vécu de ses bienfaits autant que de mon propre travail, et j'ai appris dès mon enfance à vénérer et à bénir son nom.

GEORGE SAND, *la Famille de Germandre.*

2. *Translate into French:* Although the poor man believes that he has little to say, yet he thinks that he ought to speak.

GERMAN.

1. *Translate into English:*

Des Abends in den schmalen Strassen der grossen Stadt, wenn die Sonne unterging und die Wolken oben wie Gold zwischen den Schornsteinen glänzten, hörte häufig bald der eine bald der andere einen sonderbaren Laut, gerade wie den Klang einer Kirchenglocke, aber man hörte es nur einen Augenblick, denn da war ein solches Rasseln von Wagen und solches Rufen, und das stört. "Nun läutet die Abendglocke!" sagte man, "nun geht die Sonne unter!"

Die, welche ausserhalb der Stadt gingen, wo die Häuser weiter von einander entfernt lagen, mit Gärten und kleinen Feldern dazwischen, die sahen den Abendhimmel noch prächtiger und hörten den Klang der Glocke weit stärker. Es war, als käme der Ton von einer Kirche tief aus dem stillen, duftenden Walde, und die Leute blickten dorthin und wurden ganz andächtig.

ANDERSEN.

2. *Translate into German:* Do you hear the evening bell? It says to the people, as it tolls, that the sun has gone down. Then they stand still and become very devout.

Examination for Admission to the Massachusetts State Normal Schools, September 8 and 9, 1896.

II. MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. Which is the greater, and by how much, the least common multiple of 5, 6, 15 and 20 or the greatest common divisor of 816 and 1,680?

2. A man buys 350 tons of coal, paying for it $3.50 per ton of 2,240 pounds. He sells it for $4.25 per ton of 2,000 pounds. What is his profit?

Take either 3 or 4.

3. Reduce ten per cent. of 3 days, 15 hours and 30 minutes to the decimal of a week.

4. The entire number of pupils belonging to a school on Monday was 153. The only changes in membership during the week were due to three permanent withdrawals at the close of Tuesday's session and four permanent accessions at the beginning of Friday's session. The pupils in actual attendance on Monday, Tuesday, Wednesday, Thursday and Friday numbered 150, 146, 147, 149 and 148 respectively. What was the percentage of attendance for the week?

ALGEBRA.

Take either 1 or 2.

1. Put the following into algebraic form and *simplify* it:

Multiply by c the sum of ab and b^2, increase this product by a^2c, divide the sum thus obtained by the excess of b over a, and subtract the quotient from c times the sum of a and b.

2. Find the value of x in the following:

$$\frac{6x+7}{15}-\frac{2x-2}{7x-6}=\frac{2x+1}{5}$$

Take either 3 or 4.

3. The sum of two numbers is 224 and the ratio of the larger to the smaller is as 17 to 15. What are the numbers?

(*a*) With the aid of but one unknown quantity, deduce the equation, but do not solve it.

(*b*) With the aid of two unknown quantities, deduce the equations, but do not solve them.

4. Let a cube whose edge is $a+b$ be divided into cubes the edge of each of which is $\frac{a+b}{2}$.

(*a*) Express in terms of a and b the entire surface of the large cube before division.

(*b*) Express in terms of a and b the sum of the surfaces of the smaller cubes after division.

(*c*) How many times is the original surface increased by such division?

(*d*) Connect this principle of the increase of surface caused by the subdivision of matter with any fact or phenomenon it may help to explain (e. g , the floating of dust in the air).

Take either 5 or 6.

5. A certain principal p, when put at interest at r per cent. for t years, yields an amount a.

(*a*) Write the formula for a.

(*b*) From this formula find r.

(*c*) Express in words the truth expressed in the formula for r (that is, translate the formula into a rule).

(*d*) With the aid of the formula for r, find at what rate per cent. a principal of $480 must be put at interest to yield in 4 years an amount of $566.40?

6. Find three consecutive numbers such that their sum shall equal the product of the first two.

GEOMETRY.

Take either 1 or 2.

1. In the triangle A B C, let the angle B be greater than the angle C. Prove that A C is greater than A B.

2. The triangle A B C is right-angled at B. D is the middle point in A C. Draw the line B D. Prove that B D equals one-half of A C.

Take either 3 or 4.

3. Show how a line may be divided geometrically into three equal parts.

On what geometric principle or theorem is your solution based?

4. Two maps of Massachusetts are correctly made to different scales. The distance in a straight line from Boston to Worcester is represented on the scale of miles of the smaller map by two inches and on the scale of miles of the larger map by five inches.

(*a*) If the distance from Boston to Springfield is represented by y inches of the scale of miles of the smaller map, how many inches would represent the same distance on the scale of miles of the larger map?

Give the theorem on which your answer is based.

(*b*) What number of square inches will represent the area of the larger map, if the area of the smaller map is represented by $x + 10$ square inches?

Give the theorem on which your answer is based.

Take either 5 or 6.

5. What is the measure of the angle made by a tangent and a chord intersecting at the same point in the circumference of a circle? Prove it.

6. The radius of a circle is r. Express in terms of r the area of a regular inscribed hexagon.

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III. HISTORY AND GEOGRAPHY.

Take pains with your English. Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take 2, 3 or 4.

2. THE ENGLISH IN VIRGINIA AND IN MASSACHUSETTS.

(*a*) The lands granted to the Plymouth and the London Companies, with the location and date of the first permanent settlement in each.

(*b*) One or two differences between the first settlers of Massachusetts and those of Virginia in respect to motives for immigration.

(*c*) Some differences in respect to their farms, their crops and their dependence on the labor of others.

(*d*) One or two differences in respect to notions of self-government (which colony was the more democratic or the more aristocratic, with reasons for your view?).

(*e*) One or two contributions by each to the American Revolution.

3. THE STRUGGLE BETWEEN ENGLAND AND FRANCE FOR THE MASTERY OF NORTH AMERICA (1689 TO 1763).

(*a*) The English and the French claims to territory in North America as they stood in 1689, and how, in the case of the Mississippi Valley, they conflicted.

(*b*) The four wars waged in this country during the struggle. If the candidate is able to do so, he may allude also to the corresponding wars in Europe and show briefly how the two series were related.

(*c*) The part taken by the Indians (not omitting the Iroquois) during these wars, with one or two reasons therefor.

(*d*) The final outcome of the struggle.

(*e*) Either the nature of the traces one might expect to find to-day of a former French occupation of a portion of our country or the historic basis of Longfellow's *Evangeline*.

4. THE CRITICAL PERIOD BETWEEN 1783 AND 1789.

(*a*) Two or three sources of weakness in the government of the United States during this period.

(*b*) Two or three causes of State jealousies and antagonisms during this period.

(*c*) The money of this period.

(*d*) The movement for a better government and some of its leaders.

(*e*) The outcome of the movement and the wisdom of that outcome.

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IV. SCIENCES.

Answer *one question only* under each science. Take pains with the quality of your work, aiming for good English as well as for intelligent and correct statements. Time allowed for the entire paper, two hours.

PHYSICAL GEOGRAPHY.

Take 1 or 2.

1. Write about rivers, — their erosive work and how it varies, their sinuosity, their transportation and deposition of material, and their tendency, under some conditions, to divide into branches before emptying into the sea.

2. Write about the atmosphere, — the relation of its equilibrium to its density, why lighter air rises, causes that make the air lighter, the normal general movement of the air between the equator and either pole, and the effect of the earth's rotation on this movement.

PHYSIOLOGY.

Take 1 or 2.

1. Write about the blood under the following heads: —

(*a*) Its ingredients, solid and liquid.

(*b*) Where and how the food when digested enters it.

(*c*) Its changes in the capillaries compared with its changes in the lungs.

(*d*) Coagulation, — its cause, method and importance.

2. Show (*a*) how animal heat is produced, (*b*) how it is regulated, (*c*) why bodily discomfort is so great on a warm day whose humidity is high, and (*d*) how the skin tends to become soiled and clogged through its own processes so as to need frequent cleansing.

PHYSICS.

1. State whether in your study of physics you have performed experiments and kept a notebook; and if so, to what extent.

Take 2, 3 or 4.

2. In a hydraulic (or hydrostatic) press the area of the small piston face is one square inch and that of the large piston face is 40 square inches. Suppose a force of 50 pounds is applied to the small piston and friction is ignored.

(*a*) What is the force exerted on the large piston?

(*b*) Compare the distances the two pistons move in the same time; also their velocities.

(*c*) Describe a unit of work convenient to use in comparing the amounts of work done upon the two pistons.

(*d*) How much work is done upon the small piston while it moves 4 inches, and how much is done in the same time upon the large piston?

3. Suppose heat is applied to a basin of ice water containing ice until the water boils.

(*a*) What pauses and changes in temperature would a thermometer indicate throughout the process?

(*b*) Precisely what work does the heat do when the mercury is stationary?

(*c*) The boiling point in a deep mine as compared with the same point on a high mountain? Reason for the difference?

(*d*) Explain the paradox that freezing is a warming process.

4. Make a diagram of a voltaic cell, naming the metals and the liquid, marking the poles, and indicating the direction of the current as commonly assumed.

(*a*) What is the source of the electricity developed?

(*b*) Its quantity depends on what?

(*c*) Local action in the zinc, — its cause, the objection to it and the remedy.

(*d*) Possible transformations of electrical energy in a wire connecting the poles.

CHEMISTRY.

1. State whether in your study of chemistry you have performed experiments and kept a notebook; and if so, to what extent.

Take 2, 3 or 4.

2. Acids, bases and salts:

(*a*) Name the following, classifying them as acids, bases and salts: K_2O, K_2SO_4, H_2SO_4, HNO_3, $HKSO_4$, KOH, Na NO_3.

(*b*) Acids, — their common or essential constituent and how salts (normal, acid or basic) are derived from them, with illustrations.

(*c*) The behavior of a salt when subjected to electrolysis.

(*d*) How many grams of each element are there in twenty grams of pure nitric acid?

3. Write about the air:

(*a*) Its chief ingredients and the effect on animal life if each ingredient in turn were to be present in sudden and great excess.

(*b*) Whether the air is a compound or a mixture, with reasons.

(*c*) How one of the chief ingredients may be obtained in a free and separate state from the air with the aid of phosphorus.

(*d*) The carbon dioxide of the air, — its source and the evenness of its distribution.

4. Write about carbon:

(*a*) Its allotropic forms and why they are so called.

(*b*) The properties of carbon that explain its disinfecting power, with an illustrative experiment.

(*c*) The carbon compound in air from the lungs, its origin (any of it inhaled?), and the lime water test of its presence with the equation for the reaction.

(*d*) How anthracite coal differs from bituminous.

BOTANY.

1. To what extent has your study of botany been objective? Have you examined structures, performed experiments, made analyses, collected specimens, kept a notebook, etc.?

Take 2, 3 or 4.

2. Write about buds:

(*a*) What they are, the two sorts of position in which they grow, and what they become as they develop.

(*b*) The protection of buds, — when needed and the nature of it when it exists.

(*c*) Adventitious buds, with an illustration.

(*d*) Effect upon the symmetry of a tree if every bud were to develop evenly and fully like every other of its kind, with causes that reduce this symmetry.

3. Write upon fertilization in flowering plants:

(*a*) The organs and the process.

(*b*) Self-fertilization, — what it is and how it is frequently defeated.

(*c*) Cross-fertilization, — what it is and agencies that promote it.

(*d*) Dioecious plants, — what kind of plants they are and the sort of fertilization they are dependent upon.

4. Describe fully and in botanical terms the seed vessel or fruit submitted to you for examination. Make one or two sketches, sections or diagrams to show facts about the specimen.

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V. DRAWING AND MUSIC.

The candidate will take both Drawing and Music. Time for the entire paper, one hour.

DRAWING.

Take 1, 2 or 3.

1. Make small freehand sketches of a sphere, a cylinder and a cube. Name all the geometric terms which may be illustrated by the details of these three solids.

2. Rule an oblong $3\frac{1}{4}''$ wide and $5''$ long. This oblong represents a grass plot $13' \times 20'$. Indicate, by drawing a circle, the size and position of a six-foot basin for a fountain in the centre of the plot. State the shortest distance in feet and inches between the basin and the side of the plot. State the approximate distance in feet and inches from corner to corner diagonally across the plot.

3. Make a drawing of a natural leaf, from the object. Make a conventional drawing of the same.

Take 4 or 5.

4. Sketch from memory a simple vase form.

5. Sketch from memory a Greek cross. Indicate its geometric construction lines.

Take 6 or 7.

6. Sketch a cube, placed below the level of the eye, and turned so that three faces are visible, two being equally foreshortened. Draw from the object or from memory, stating which.

7. Sketch from the object an open book below the level of the eye.

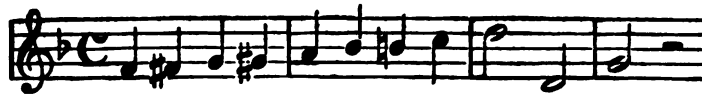
MUSIC.

1. Do you read music or sing or play a musical instrument? Give some account of such musical training as you may have received.

Take 2 or 3.

2. Write on a staff four measures in two-four time, using notes, dots and rests as values. Write the treble or G clef and place figures properly on the staff to indicate the time.

3. Give (*a*) the signature, (*b*) the key, (*c*) the measure, (*d*) the scale names of the notes in order, and (*e*) the pitch names of the notes in order of the following: —



Examination for Admission to the Massachusetts State Normal Schools, June 24 and 25, 1897.

I. LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. *Let careful attention be given to spelling, punctuation, capitalization, syntax, paragraphing and idiom.* Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Shakespeare's *As You Like It*; Defoe's *History of the Plague in London*; Irving's *Tales of a Traveller*; Hawthorne's *Twice-Told Tales*; Longfellow's *Evangeline*; George Eliot's *Silas Marner*.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear and correct way.

(*a*) Either of the following:
Any incident in the story of Rosalind.
The fool in *As You Like It*.

(*b*) Either of the following:
The historic accuracy of Defoe's *History of the Plague*.
Why Defoe's *History of the Plague* has a place in literature.

(*c*) Either of the following:
The Great Carbuncle.
A Rill from the Town Pump.

(*d*) Either of the following:
How the story of Evangeline begins.
How the story of Evangeline ends.

(*e*) Either of the following:
Silas Marner's Gold.
Eppie's Choice of Fathers.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other written work done in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

3. Tell what books of the following list you have critically studied: Shakespeare's *Merchant of Venice*; Burke's *Speech on Conciliation with America*; Scott's *Marmion*; Macaulay's *Life of Samuel Johnson.*

4. Comment on *one only* of the passages (*a*), (*b*), (*c*) and (*d*) that follow, limiting yourself to the points suggested:

(*a*) Now he goes
With no less presence, but with much more love,
Than young Alcides, when he did redeem
The virgin tribute paid by howling Troy
To the sea monster: I stand for sacrifice;
The rest aloof are the Dardanian wives,
With bleared visages, come forth to view
The issue of th' exploit. Go, Hercules!
Live thou, I live. With much, much more dismay
I view the fight than thou that mak'st the fray.

Points to be treated: (1) The speaker and the occasion that prompts the speech; (2) the classical allusion; (3) the facts or features of the occasion that, in the speaker's mind, are the parallels respectively of *Alcides*, the *virgin tribute*, *howling Troy*, the *sea monster* and the *redeeming* of the tribute; (4) the justification of *much more* in the expression *with much more love*, and of *howling* in the expression *howling Troy*; (5) the expression *Live thou, I live.*

(*b*) My next example is Wales. This country was said to be reduced by Henry the Third. It was said more truly to be so by Edward the First. But though then conquered, it was not looked upon as any part of the realm of England. . . . . .
. . . . . .

The march of the human mind is slow. Sir, it was not, until after two hundred years, discovered, that, by an eternal law, Providence had decreed vexation to violence and poverty to rapine. Your ancestors did however at length open their eyes to the ill husbandry of injustice. . . . . .
. . . . . .

When the day-star of the English constitution had arisen in their hearts, all was harmony within and without —

— Simul alba nautis
Stella refulsit,
Defluit saxis agitatus humor;
Concidunt venti, fugiuntque nubes,
Et minax (quod sic voluere) ponto
Unda recumbit.

Points to be treated: (1) The nature of that experience of England with Wales to which Burke calls attention in the passage to which the foregoing sentences belong; (2) the particular lesson Burke would have England draw from that experience; (3) the meaning of the expression *decreed vexation to violence and poverty to rapine;* (4) the figure of rhetoric in the expression *ill husbandry of injustice;* (5) either the translation of the Latin passage or the sentiment it contains.

(*c*) Deep drank Lord Marmion of the wave,
And, as she stoops his brow to lave —
"Is it the hand of Clare," he said,
"Or injured Constance, bathes my head?"
Then, as remembrance rose, —
"Speak not to me of shrift or prayer!
I must redress her woes.
Short space, few words, are mine to spare;
Forgive and listen, gentle Clare!"
"Alas!" she said, "the while, —
Oh! think of your immortal weal!
In vain for Constance is your zeal;
She — died at Holy Isle."

Points to be considered: (1) The battle raging at the time; (2) the plight of Marmion; (3) how Clare chances to be there; (4) why Marmion's doubt about the *hand* that befriends him; (5) the justification of *injured* in *injured Constance;* (6) the distinction between *shrift* and *prayer;* (7) the *woes* of Constance; (8) Marmion's need of forgiveness from Clare; (9) Marmion's *immortal weal;* (10) *Holy Isle.*

(*d*) Quote several lines — ten to fifteen or more — from either the *Merchant of Venice* or *Marmion*, and comment upon them at discretion.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Pyrrhus inquires of Hannibal who the greatest commander in the world is.*

Translate into idiomatic English:

Hannibal a Scipione victus, suisque invisus, ad Antiochum, Syriae regem, confugit, eumque hostem Romanis fecit. Missi sunt Romà legati ad Antiochum, in quibus erat Scipio Africanus, qui cum Hannibale collocutus ab eo quaesivit, quem fuisse maximum imperatorem crederet? Respondit Hannibal Alexandrum Macedonum regem maximum sibi videri, quòd parvà manu innumerabiles exercitus fudisset. Interroganti deinde,

quem secundum poneret: "Pyrrhum," inquit, "quòd primus castra metari[1] docuit, nemoque illo elegantius loca cepit, et praesidia disposuit." Sciscitanti demum, quem tertium duceret, semetipsum dixit. Tum ridens Scipio: "Quidnam tu diceres," inquit, "si me vicisses?" "Tum me vero," respondit Hannibal, "et ante Alexandrum et ante Pyrrhum et ante alios omnes posuissem." Ita improviso assentationis[2] genere Scipionem e grege imperatorum velut inaestimabilem secernebat.

[1] To mark or lay out. [2] Flattery.

Translate into Latin: It seems to me that Alexander is the greatest general, that Pyrrhus is the second, and that I am the third; but had Pyrrhus been conquered by me, I should have been placed ahead of Alexander.

(*b*) *Dido bids the Trojans welcome to Carthage.*
Translate into idiomatic English:

Solvite corde metum, Teucri, secludite curas.
Res dura et regni novitas me talia cogunt
moliri, et late finis custode tueri.
Quis genus Aeneadum, quis Trojae nesciat urbem
virtutesque virosque, aut tanti incendia belli?
Non obtusa adeo gestamus pectora Poeni,
nec tam aversus equos Tyria Sol iungit ab urbe.
Seu vos Hesperiam magnam Saturniaque arva,
sive Erycis finis regemque optatis Acesten,
auxilio tutos dimittam, opibusque iuvabo.
Voltis et his mecum pariter considere regnis;
urbem quam statuo, vestra est; subducite navis;
Tros Tyriusque mihi nullo discrimine agetur.

Aeneid I., 561–574.

FRENCH.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on.

2. *Translate into idiomatic English:*

AUSTERLITZ, 12 frimaire.[1]

SOLDATS,

Je suis content de vous: vous avez à la journée d'Austerlitz justifié tout ce que j'attendais de votre intrépidité. Vous avez décoré vos aigles d'une immortelle gloire. Une armée de cent mille hommes, commandée par les empereurs de Russie et d'Autriche, a été en moins de quatre heures ou coupée ou dispersée. Ce qui a échappé à votre fer s'est noyé dans les lacs.

Quarante drapeaux, les étendards de la garde impériale de Russie, cent vingt pièces de canon, vingt généraux, plus de trente mille prisonniers sont le résultat de cette journée à jamais célèbre. Cette infanterie tant vantée, et en nombre supérieur, n'a pu résister à votre choc, et désormais vous n'avez plus de rivaux à redouter. Ainsi, en deux mois, cette troisième coalition a été vaincue et dissoute. La paix ne peut plus être éloignée; mais, comme je l'ai promis à mon peuple avant de passer le Rhin, je ne ferai qu'une paix qui nous donne des garanties, et assure des récompenses à nos alliés.

[1] The third month of the Republican calendar, — Nov. 21 to Dec. 20.

Soldats, lorsque tout ce qui est nécessaire pour assurer le bonheur et la prospérité de notre patrie sera accompli, je vous ramèneral en France; là vous serez l'objet de mes plus tendres sollicitudes. Mon peuple vous reverra avec joie, et il vous suffira de dire: J'étais à la bataille d'Austerlitz, pour que l'on vous réponde: Voilà un brave!

NAPOLEON.

3. *Translate into French:* When the soldiers of Napoleon say, "We were at the battle of Austerlitz," the people look upon them with joy and say, "Behold brave men!"

GERMAN.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on.

2. *Translate into idiomatic English:*

Ein alter Mann ging einmal an einer Krücke[1] des Weges dahin und weil er sehr arm war, fühlte er traurig und wünschte zu sterben. Er warf seine Krücke von sich, legte sich auf die Erde und rief mit lauter Stimme: "O Tod, komme doch und errette mich von meinem Elend!" Da stand auf einmal der Tod vor ihm, eine Sense in seiner knöchernen Hand, und fragte ihn mit heiserer Stimme: "Mein Freund, was willst Du von mir, dass Du mich so laut rufst? Hier bin ich." "O," sagte der alte Mann, indem ihm die Zähne klapperten, "meine Krücke ist mir auf den Boden gefallen. Willst Du so gut sein und sie mir wieder geben?" Der Tod that es und verschwand.

[1] Crutch.

3. *Translate into German:*

Do you think that the old man felt (was) sad?
He certainly was sad, because he wished to die.
"Is that you?" "Yes, sir, it is I. What do you wish?"

Examination for Admission to the Massachusetts State Normal Schools, June 24 and 25, 1897.

II. MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. The owner of $\frac{3}{11}$ of a mine sold $\frac{9}{10}$ of his share of the mine for $40,500. At the same rate, what should he who owns $\frac{3}{5}$ of the same mine get for $\frac{5}{9}$ of his share?

2. When it is noon by clock time (not standard time) in Boston, longitude 71° 3′ 30″ W., what is the clock time in San Francisco, longitude 122° 26′ 15″ W.?

Take either 3 or 4.

3. Teas at 59 cents, 65 cents and 76 cents per pound respectively are mixed in equal quantities and sold at $1 per pound. Find the gain per cent.

4 June 12, 1897, Richard Doe bought of John Doe, at the latter's store in Boston, 3 yds. silk @ $1.45; 2½ yds. lining @ 20 cts.; 3 prs. kid gloves @ $1.25; 30 buttons @ 25 cts. a dozen; ½ doz. handkerchiefs @ 25 cts. a piece; 1 hat for $3.00. A discount of 5 per cent. was allowed on the amount of the purchase.

Make out an itemized bill and receipt it in full.

ALGEBRA.

Take either 1 or 2.

1. Indicate algebraically all the operations to be performed in the following and then simplify the expression thus obtained: —

Multiply the sum of a and b by a, diminish this product by the square of the excess of a over b, divide the remainder by one half the sum of a and b, and subtract the quotient thus obtained from $2b$.

2 Reduce $\frac{2x^2-3x-2}{5x^2-7x-6}$ to its lowest terms.

Take either 3 or 4.

3. A number is divided by d, and the sum of the dividend, the divisor and the quotient is b. What is this number? Find the number when $d = 12$ and $b = 129$.

4. A certain principal p, when put at interest at r per cent. for t years, yields an amount a.

(*a*) Write the formula for a.

(*b*) From this formula find t.

(*c*) Express in words the truth expressed in the formula for t (that is, translate the formula into a rule).

(*d*) With the aid of the formula for t, find for what time a principal of $480 must be put at interest at 5 per cent. to yield an amount of $566.40?

Take either 5 or 6.

5. There are two stations 12 miles apart. Two persons start from these stations at the same time and walk towards each other until they meet, one at the rate of 3 miles an hour and the other at the rate of 4 miles an hour. How far is it from the place of meeting to the *nearer* station?

(*a*) Frame an equation, but do not solve it, using but one unknown quantity.

(*b*) Frame equations, but do not solve them, using two unknown quantities.

In both (*a*) and (*b*), let x represent the distance in miles to the nearer station.

6. Solve the equation $6\ (x - \frac{1}{2})\ (x + \frac{1}{3}) = 0$

GEOMETRY.

Take either 1 or 2.

1. A B is a given straight line, and C and D are two points outside of A B There is a point E in A B that is equally distant from C and D.

(*a*) Tell how E may be located by construction.

(*b*) Prove that C E = D E.

2. Select a point X in the base B C of an isosceles triangle A B C such that a perpendicular to B C erected at X shall cut the side A B at any point Y and meet the side A C produced at Z. Prove that the triangle A Y Z is isosceles.

Take either 3 or 4.

3. A line D E dividing the two sides A B and A C of the triangle A B C proportionally is parallel to B C.

4. In the right triangle A B C, let fall a perpendicular from the vertex of the right angle B to the point D upon the hypothenuse A C.

(*a*) Compare the three triangles thus obtained.

(*b*) A B and B C are mean proportionals between what respectively?

(*c*) Consequently the squares of A B and B C equal what respectively?

(*d*) Adding the two equations thus obtained and simplifying, what equation results?

(*e*) What proposition may be inferred from this resulting equation?

Take either 5 or 6.

5. Two tangents drawn from the same point to a circumference compare how with each other? Prove the truth of your answer.

6. Let a represent the altitude of an equilateral triangle and x one of its sides.

(*a*) Find x in terms of a.

(*b*) Translate the formula for x into a rule for solving all cases like the one given

(*c*) Apply this rule to finding the side of an equilateral triangle whose altitude is 20.

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III. HISTORY AND GEOGRAPHY.

Take pains with your English. Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take 2, 3, 4 or 5.

2. **AMERICA BEFORE 1492.**

(*a*) Its inhabitants and their various degrees of civilization.

(*b*) The Northmen, — who they were, where they settled and in what century, and the country explored by them.

(*c*) Why the discovery of America is more commonly attributed to Columbus than to the Northmen.

(*d*) Trade and trade routes between Europe and Asia, and what they had to do with the discovery of America by Columbus.

(*e*) Considerations that led Columbus to plan his great voyage in 1492.

3. **SOME CAUSES OF THE REVOLUTION.**

(*a*) Writs of Assistance, — what they authorized and for what purpose.

(*b*) The Stamp Act, — its nature and object, and the great principle that it violated.

(*c*) The imposition of duties by England on certain articles, including tea, and why the colonists objected thereto.

(*d*) Conflicting views in England about the foregoing measures and the view that finally prevailed.

(*e*) The attitude of the colonists towards these measures, and how they showed this attitude before the war began.

4. THE CONSTITUTION OF THE UNITED STATES.

(*a*) Two or three important respects in which the government of the country from the Revolution down to 1789 was weak and unsatisfactory.

(*b*) How the Constitution remedied these defects.

(*c*) The departments of government established by the Constitution, with the function of each.

(*d*) A few things that Congress can constitutionally do and a few things that Congress cannot constitutionally do.

(*e*) Illustrations to show the exercise of national, of State and of town authority in the same community or side by side.

5. THE CIVIL WAR.

(*a*) The causes that brought it on.

(*b*) The blockade of the southern ports, — its object, extent and success.

(*c*) The importance of the Mississippi to each side, the struggle for its possession, and the final event that settled that struggle in favor of the North.

(*d*) Sherman's march to the sea and what was accomplished or demonstrated by it.

(*e*) Some of the things settled by the war.

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IV. SCIENCES.

Take pains with the quality of your work, aiming for good English as well as for intelligent and correct statements. Time allowed for the entire paper, two hours.

PHYSICAL GEOGRAPHY.

Take 1, 2 or 3.

1. Compare the northern and the southern parts of the Atlantic Coast in respect to (*a*) formation, (*b*) degree of irregularity, (*c*) number of important bays (estuaries), (*d*) importance to trade, (*e*) prevalence of cities, and (*f*) beauty.

2. Describe the plains of India as to (*a*) formation, (*b*) drainage, (*c*) climate, (*d*) fertility, (*e*) vegetation, (*f*) population, and (*g*) commercial importance.

3. Write about water under the following heads: —

(*a*) Evaporation, — definition, form of water that results, usefulness of the process, effect on the temperature of the atmosphere.

(*b*) Condensation, — definition, forms of water that result, usefulness of the process, effect on the temperature of the atmosphere.

(*c*) Some effects of the action of water, in its various forms, upon the surface of the earth.

PHYSIOLOGY.

Take either 1 or 2.

1. Write about the organs of respiration under the following heads: —

(*a*) What they are, — their various parts and divisions.

(*b*) The mechanism of breathing, — particularly the part played by the ribs and diaphragm.

(*c*) The importance of pure air in breathing.

(*d*) How the air that issues from the lungs varies from that which enters them.

2. Write about the eye under the following heads: —

(*a*) Its coats, humors, lens, etc., with a sectional diagram, if possible, to show their relative positions.

(*b*) What takes place when we *see* an object.

(*c*) How the eye accommodates itself to light and distance.

(*d*) Two or three important rules to be observed in using the eyes.

PHYSICS.

1. State whether in your study of physics you have performed experiments and kept a notebook; and if so, to what extent.

Take 2, 3 or 4.

2. Discuss the subject of energy under the following heads, giving with each statement of principle some illustration to show what you mean by it: —

(*a*) Definition of energy.

(*b*) Forms of energy.

(*c*) Transformation of energy.

(*d*) Conservation of energy.

3. Write about light under the following heads, drawing a diagram in any case in which it will make your meaning more plain: —

(*a*) The difference between the reflection and the refraction of light.

(*b*) The dispersion of light.

(*c*) Optical instruments in which the principles of reflection or of refraction are applied, with a diagram of at least one of them.

(*d*) Natural phenomena dependent upon or illustrating refraction or dispersion.

4. Write about electricity under the following heads, giving in each case the principles involved and naming some instrument or process in which the principles are applied: —

(*a*) The production of electro-magnets.

(*b*) The deflection of a magnetic needle by an electric current.

(*c*) The decomposition of compounds by an electric current.

(*d*) The production of induced currents.

CHEMISTRY.

1. State whether in your study of chemistry you have performed experiments and kept a notebook; and if so, to what extent.

Take 2, 3 or 4.

2. Write about carbonic acid in accordance with the following plan: —

(*a*) How it may be made and collected.

(*b*) The chemical equation for the reaction.

(*c*) Experiments to show some of its properties.

(*d*) A method of showing its presence in air exhaled from the lungs.

(*e*) The sources of the carbonic acid found in the air and the evenness of its distribution.

3. Write about flame under the following heads: —

(*a*) The color, heat and product of combustion in the case of the hydrogen flame.

(*b*) How the hydrogen flame may be made luminous.

(*c*) The cause of the light in an ordinary gas or candle flame.

(*d*) Why a chimney is needed for a kerosene lamp.

(*e*) The effect of thrusting a sheet of wire gauze into a gas or candle flame as if to cut it off and the explanation of that effect.

4. To dilute nitric acid add slowly a somewhat dilute solution of caustic potash (potassium hydroxide).

(*a*) How may the excess of either at any time be determined, and how may it be known when neither is in excess?

(*b*) Symbolize the change that takes place, *i.e.*, write the chemical equation for it.

(*c*) Show from this experiment one or two general characteristics of an acid, a base and a salt.

(*d*) Compare the symbol of potassium nitrate with that of nitric acid, and with this comparison in mind define a nitrate and a salt.

(*e*) Write symbols for the nitrates of silver and sodium; also for the nitrates of copper and zinc.

BOTANY.

1. To what extent has your study of botany been objective? Have you examined structures, performed experiments, made analyses, collected specimens, kept a notebook, etc.?

Take 2, 3 or 4.

2. Explain the italicized botanical terms in the following uses, illustrating with diagrams where they are helpful: —

1. A *dicotyledonous* seed.
2. An *adventitious* bud.
3. A *dioecious* plant.
4. An *odd-pinnate* leaf.
5. *Verticillate* leaves.
6. A *complete* flower.
7. *Hypogynous* stamens.
8. A *superior* ovary.
9. A *dehiscent* fruit.
10. An *exogenous* stem.

3. Describe in botanical terms the flower, fruit or seed vessel submitted to you by the examiner. Make two or three sketches, sections or diagrams to show facts about the specimen.

4. The essential organs of flowering plants: —

(*a*) Stamens, — their structure and purpose.

(*b*) Pistils, — their structure and purpose.

(*c*) Exceptions to their association in the same flower.

(*d*) Self-fertilization, — what it is and how it is often defeated.

(*e*) Cross-fertilization, — what it is and various agents that promote it.

Examination for Admission to the Massachusetts State Normal Schools, June 24 and 25, 1897.

V. DRAWING AND MUSIC.

The candidate will take both Drawing and Music. Time for the entire paper, one hour.

DRAWING.

1. Make an accurate drawing of an equilateral triangle three inches on a side. Suppose this to represent the outline of a window frame three feet on each side. Draw to scale lines to represent the frame as three inches wide, and add $\frac{3}{4}$-inch sash lines dividing the opening into four equal and similar panes. Measure and state as nearly as possible the actual size of one of the panes.

2. Make a drawing of a twig with at least two leaves. Draw from the object.

Take either 3 or 4.

3. Sketch a book, from the object, below the level of the eye and turned at an angle.

4. Sketch some part of the room in which you are sitting, — a window, a door, a corner of the room, a desk or chair.

Take either 5 or 6.

5. Draw a simple rosette from memory.

6. Make a simple design for a border (such as may be found among the advertisements in magazines), using one of the leaves already sketched as a conventional unit.

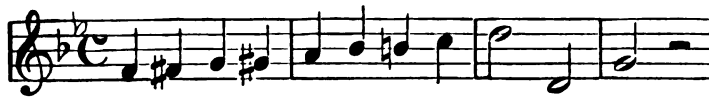
MUSIC.

1. Do you read music or sing or play a musical instrument? Give some account of such musical training as you may have received.

Take either 2 or 3.

2. Make a diagram of the music ladder, representing the steps and half steps, the pitch names, the scale names and the syllables for the major scale.

3. Give (*a*) the signature, (*b*) the key, (*c*) the measure, (*d*) the scale names of the notes in order, and (*e*) the pitch names of the notes in order of the following: —



Examination for Admission to the Massachusetts State Normal Schools, September 7 and 8, 1897.

I. LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. *Let careful attention be given to spelling, punctuation, capitalization, syntax, paragraphing and idiom.* Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Shakespeare's *As You Like It*; Defoe's *History of the Plague in London*; Irving's *Tales of a Traveller*; Hawthorne's *Twice-Told Tales*; Longfellow's *Evangeline*; George Eliot's *Silas Marner*.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear and correct way.

(*a*) Either of the following:
As You Like It, — whether you like it or not, and why.
The story of Rosalind.

(*b*) *The History of the Plague in London*, — why people have been deceived as to its historical character, why it has a place in literature, etc.

(*c*) Any one of the *Tales of a Traveller*.

(*d*) Either of the following:
Little Annie's Ramble.
A Rill from the Town Pump.

(*e*) Either of the following:
The historical and geographical elements in *Evangeline*.
Evangeline as a Sister of Mercy.

(*f*) Silas Marner's Gold, — the theft of it, his consolation during its loss, and his final recovery of it.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other written work done in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

3. Tell what books of the following list you have critically studied: Shakespeare's *Merchant of Venice;* Burke's *Speech on Conciliation with America;* Scott's *Marmion;* Macaulay's *Life of Samuel Johnson.*

4. Comment on *one only* of the passages (*a*), (*b*), (*c*) and (*d*) that follow, limiting yourself to the points suggested: —

(*a*) Mislike me not for my complexion,
The shadow'd livery of the burnish'd sun,
To whom I am a neighbour, and near bred.
Bring me the fairest creature northward born,
Where Phœbus' fire scarce thaws the icicles,
And let us make incision for your love,
To prove whose blood is reddest, his or mine.
I tell thee, lady, this aspect of mine
Hath fear'd the valiant: by my love I swear,
The best regarded virgins of our clime
Have lov'd it too. I would not change this hue,
Except to steal your thoughts, my gentle queen.

Points to be considered:

(1) The speaker's part in the play.
(2) The meaning of *shadow'd livery*, *fear'd the valiant*, *steal your thoughts.*
(3) The significance of the speaker's proving his blood the *reddest.*
(4) Shakespeare's use of the superlative.
(5) The syntax of *livery* (its case and the reason for it).
(6) The words to which *his* and *it* refer respectively.
(7) The scanning of the first line (the feet and syllables to be properly marked).

(*b*) Either of the following:

(1) Show what is meant by each of the six capital sources in the following passage from Burke: "Then, sir, from these six capital sources of *descent*, of *form of government*, of *religion* in the northern provinces, of *manners* in the southern, of *education*, of the *remoteness of situation* from the first mover of government, — from all these causes a fierce spirit of liberty has grown up."

(2) Show what Burke means by each of the following objections urged by him against the use of force with America: Its *temporary* nature, its *uncertainty*, its *impairment* of the object, and the absence of *experience* to favor it.

(*c*) On the earl's cheek the flush of rage
O'ercame the ashen hue of age;
Fierce he broke forth, — "And darest thou then
To beard the lion in his den,
The Douglas in his hall?
And hopest thou hence unscathed to go? —
No, by Saint Bride of Bothwell, no!
Up, drawbridge, grooms — what, warder, ho!
Let the portcullis fall."

Points to be considered:

(1) The cause of the earl's wrath.
(2) Justify the use of *o'ercame* and *ashen*.
(3) What is it to *beard* the lion?
(4) What act in the present case is described as bearding the lion?
(5) More about the *lion* and the *den*.
(6) *Saint Bride of Bothwell.*
(7) The *drawbridge*, the *warder* and the *portcullis*.
(8) What part of speech is *up*, and why?
(9) The object of the earl's orders, and whether that object was gained or not.

(*d*) Write about Macaulay's *Life of Samuel Johnson*, dealing with any phase of the theme at your discretion and in sympathy with such method of study as you may have adopted, or getting your suggestions from such heads as the following: The work for which the life was originally written; why it has survived the fate of ordinary reviews; what qualities in Macaulay's picture of Johnson you like or are impressed by, with reasons for your view; whether liking the picture in this case is liking the person depicted, with reasons for your view; another famous life of Johnson, and one or two respects in which it differs from Macaulay's; two or three characteristics of Macaulay's English; and so on.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *How the Spartans prepared themselves for the battle of Thermopylæ.*

Translate into idiomatic English:

Dum haec geruntur, Graeci Persas exspectabant ad Thermopylas. Erant Spartani trecenti, et socii ad quadringentos His praeerat Leonidas rex Spartanorum. Interim Xerxes speculatorem misit, qui et numerum eorum, et quid facerent, exploraret. Ubi ad murum accessit, nonnullos e Graecis vidit: quorum alii gymnasticis exercitationibus se delectabant, alii comam pectebant. Reversus, Xerxi cuncta quae viderat renuntiavit.

Quibus auditis, Xerxes ad se Demaratum, transfugam ex Spartanis, vocavit, cognoscere ex eo cupiens quid esset quod facerent Spartani. Cui Demaratus, "Adsunt hi viri," inquit, "nobiscum pugnaturi ut impediant quominus intremus, et ad hoc se comparant. Hic enim apud illos mos est: quando periculum adituri sunt, tunc capita comunt. Si hosce, et eos qui Spartae manent, subegeris, nullus alius hominum populus est, qui adversus te, Rex, manus tollere audeat. Nunc enim cum regno et populo inter Graecos praeclarissimo tibi pugnandum est et cum viris fortissimis."

Translate into Latin: Spies are sent to find out what the Spartans are doing. They report that it is a custom with the Spartans, when they are about to fight, to comb their hair.

(*b*) *Dido's banquet to Aeneas, and how she entertained her guest.*

Translate into idiomatic English:

Cithara crinitus Iopas
personat aurata, docuit quem maximus Atlas.
Hic canit errantem lunam solisque labores;
unde hominum genus et pecudes; unde imber et ignes;
Arcturum pluviasque Hyadas geminosque Triones;
quid tantum oceano properent se tinguere soles
hiberni, vel quae tardis mora noctibus obstet.
Ingeminant plausu Tyrii, Troesque sequuntur.
Nec non et vario noctem sermone trahebat
infelix Dido, longumque bibebat amorem,
multa super Priamo rogitans, super Hectore multa;
nunc quibus Aurorae venisset filius armis,
nunc quales Diomedis equi, nunc quantus Achilles.
"Immo age, et a prima dic, hospes, origine nobis
insidias," inquit, "Danaum, casusque tuorum,
erroresque tuos; nam te jam septima portat
omnibus errantem terris et fluctibus aestas.

FRENCH.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on.

2. *Translate into idiomatic English:*

Opinion de Jefferson sur le Peuple Français.

Je ne puis quitter ce grand et bon pays sans exprimer mon opinion sur la supériorité de son caractère parmi toutes les nations de la terre. Je n'ai jamais connu de gens plus bienveillants, ni ayant plus de chaleur et de dévouement dans leurs amitiés choisies. Leur bonté pour les étrangers est incomparable, et l'hospitalité de Paris surpasse tout ce que j'avais imaginé de praticable dans une grand cité. Leurs capacités, aussi, dans les sciences, le caractère communicatif de leurs savants, la politesse, la facilité, et la vivacité de leur conversation, donne un charme à leur société qu'on ne trouve nulle part ailleurs. Dans une comparaison avec les autres peuples,

nous pouvons donner un aperçu de leur primauté, ce qui fut dit au sujet de Thémistocle après la bataille de Salamis. Chaque général vota pour lui-même la première récompense de valeur, et la seconde pour Thémistocle. Ainsi si on demandait à un voyageur de quelque pays que ce fût: "Dans quel pays sur la terre préfèreriez-vous vivre?" "Certainement dans le mien, où sont tous mes amis, mes parents, et les plus douces affections et les souvenirs de mon enfance et de toute ma vie." "Quel serait votre second choix?" "La France."

GERMAN.

1. Tell what you have done in the study of German, — the time spent, the books read, and so on.

2. *Translate into idiomatic English:*

Jeden Sommer brachte der Kaiser, seiner Gesundheit wegen, einige Wochen in Ems[1] zu. Die Kinder da kannten den freundlichen Herrn sehr gut, und freuten sich immer lange vorher auf seine Ankunft. Als er nach dem französischen Kriege einmal wieder in Ems war, stand eine Schar fröhlicher Knaben vor dem Fenster eines Ladens, wo viele Bilder ausgestellt waren. Sie betrachteten mit grosser Aufmerksamkeit die Bilder der berühmten Helden aus dem letzten Kriege, und hielten Rat, welches Bild das wünschenswerteste sei. Endlich rief ein kleiner Knabe: "Ich werde mir den Kaiser kaufen!" Sogleich riefen die anderen: "Ja, ja, den Kaiser wollen wir kaufen!" Hinter ihnen aber stand ein alter Herr, der unbemerkt dem Gespräche zugehört hatte. Es war der Kaiser selbst. Freundlich trat er heran und sagte: "Kommt mit, ich will euch den Kaiser kaufen," führte sie in den Laden und kaufte jedem sein Bild.

[1] A health resort in Prussia.

Examination for Admission to the Massachusetts State Normal Schools, September 7 and 8, 1897.

II. MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. (*a*) If 5 is added to both terms of the fraction $\frac{6}{7}$, is the fraction increased or diminished, and by how much?

(*b*) If 5 is subtracted from both terms of the fraction $\frac{6}{7}$, is the fraction increased or diminished, and by how much?

2. Make a diagram to any convenient scale of a piece of paper that may be so folded as to cover exactly the six faces of a brick $8 \times 4 \times 2$ inches. Indicate the parts respectively of the paper designed to cover the several faces, the dimensions of these parts, and their aggregate surface in square feet.

Take either 3 or 4.

3. One fourth per cent of my money is in my pocket, $6\frac{1}{4}$ per cent is in the bank, and the rest, amounting to $18,700, is invested in real estate. How much is in my pocket, and how much is in the bank?

4. If 400 metres equal $\frac{1}{4}$ of a mile, how many square metres are there in $\frac{1}{4}$ of an acre?

ALGEBRA.

Take either 1 or 2.

1. Factor the following and determine by inspection their greatest common divisor: —

(*a*) $ax^2 - 6ax + 9a$.

(*b*) $ax^3 - 27a$.

(*c*) $3ax^2 - 27a$

(*d*) $abx - acx - 3ab + 3ac$.

2. Simplify the following: —

$$\frac{x+y}{(y-z)\,(z-x)}+\frac{y+z}{(x-y)\,(z-x)}+\frac{z+x}{(x-y)\,(y-z)}$$

Take either 3 or 4.

3. One man can do a piece of work in a days and another man the same piece in b days: —

(*a*) How long will it take them if they both work together?

(*b*) Translate the formula thus obtained into a rule.

(*c*) Apply the rule to a case in which one man can do the work in 10 days and another man in half that time.

4. A rectangular garden is a feet long and b feet wide. Around this garden, on the outside, but close to it, there is a walk whose width is $\frac{a}{8}$ feet. Express in terms of a and b the following: —

(*a*) The perimeter of the garden.

(*b*) The outer perimeter of the walk.

(*c*) The diagonal of the garden.

(*d*) The area of the walk.

Take either 5 or 6.

5. Find a fraction such that if 1 is added to its numerator the value of the fraction becomes 1, while if 1 is added to the denominator the numerator will need to be doubled that the value of the fraction may remain 1.

6. What number is greater than its square by $\frac{1}{4}$?

GEOMETRY.

Take either 1 or 2.

1. A C is the base of the isosceles triangle A B C. Draw A E and C D perpendicular to the opposite sides. Prove that A E equals C D, giving authorities.

2. The sum of the interior angles of a polygon equals what? Give the proof. What is the sum when the number of sides of the polygon is the smallest possible? What is the sum when the number of sides is the largest possible?

Take either 3 or 4.

3. (*a*) In the proportion $a:b::c:d$, prove that the product of the extremes is equal to the product of the means, citing reasons for each step in the proof.

(*b*) If the means of a proportion are alike, what is the value of each mean expressed in terms of the extremes?

(*c*) What is the mean proportional between $1\frac{1}{4}$ and 5?

4. Triangles A B C and D E F are mutually equiangular. Prove that they are similar.

Take either 5 or 6.

5. Prove that the opposite angles of a quadrilateral inscribed in a circle are supplementary.

6. Let there be a regular inscribed polygon whose number of sides is indefinitely increased.

(*a*) What are the limits respectively of its apothem, its perimeter and its area?

(*b*) What is the area of the polygon?

(*c*) What is the area of the circle?

(*d*) What is the principle under which, in this case, the area of the circle is inferred from that of the polygon?

Examination for Admission to the Massachusetts State Normal Schools, September 7 and 8, 1897.

III. HISTORY AND GEOGRAPHY.

Take pains with your English. Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

2. THE MISSISSIPPI RIVER.

(*a*) An account of the river, — the territory drained by it, its larger tributaries, its floods, and why they tend to increase, and its commercial importance.

(*b*) The foundation and extent of the French claim to the valley of the Mississippi, and how France aimed to strengthen that claim.

(*c*) How our country came into possession of the valley east of the river, and, later, of the valley west of the river.

(*d*) Why each side in the Civil War desired to control the river.

(*e*) Vicksburg, — its location, strategic importance, siege and fall.

3. WASHINGTON'S ADMINISTRATION.

(*a*) Its financial policy, — who shaped it, how it dealt with the war debts of the Continental Congress and of the several States, and in what ways it strengthened the national government.

(*b*) Our relations with France, — what important events were taking place there, why France wanted aid from the United States, and Washington's policy in the matter.

(*c*) The Federalists, — what general policy they favored, their ablest leader and their final overthrow.

(*d*) The party that gradually developed in opposition to the Federalists, — what general policy they favored, their ablest leader and their final triumph.

(*e*) The invention of the cotton gin and some of the results that followed.

4. TERRITORIAL EXPANSION.

Write about the acquisition of territory, from time to time, by the United States, the country from whom and the method by which each addition was acquired, the motives for acquirement, and, in a general way, the location and extent of each acquisition.

5. ABRAHAM LINCOLN.

(*a*) His early life.

(*b*) His debate with Douglas.

(*c*) Two or three noteworthy facts in his career as President.

(*d*) His death.

(*e*) Some characteristics of him as a man.

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IV. SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent Under each science take one full number or topic only. Aim for good English as well as for correct statements. Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

Take 1, 2 or 3.

1. Relief Forms.

(*a*) How the grander relief forms of North America compare with those of South America.

(*b*) How the rivers of South America are affected in length and size by its relief forms, with illustrations.

(*c*) Relief forms of the world,— some of the highest and some of the lowest.

2. Rivers.

(*a*) The main stream,— what determines its location, length, size and winding character.

(*b*) The deposits,— their nature in the upper course, in the lower course and at the mouth; their quantity and what the quantity depends on; and the general effect of erosion on relief forms.

(*c*) How rivers are affected by the cutting down of forests, with reasons.

3. **Oceans.**

(*a*) The tides,— their general cause, the number of high tides and low during the day, why the tides are higher at some times than at others, etc.

(*b*) Evaporation, — where it is most abundant, how it affects the density and weight of the water, and its general relation to the movement of ocean waters.

(*c*) The Gulf Stream, — what it is, its movement and course, the condition of its waters and its effect on climate.

PHYSIOLOGY.

Take 1, 2 or 3.

1. **The Digestive Process.**

(*a*) The purpose of mastication, and how this purpose is helped or hindered.

(*b*) The general change that takes place in the stomach, and what tends to promote or thwart such change.

(*c*) The secretions discharged into the alimentary canal, the sources from which they come and their general effect on the food.

(*d*) How the digested food finally gets into the general circulation.

2. **Physical Exercise.**

(*a*) The processes that are stimulated when a muscular mechanism, as that of an arm, is exercised.

(*b*) The good effects of judicious exercise.

(*c*) The connection between the physical condition and the mental.

(*d*) Why vigorous exercise, mental or physical, is inadvisable immediately after a hearty meal.

3. **The Effects of Alcoholic Drinks.** Write upon this theme at discretion, either making your own points or getting suggestions from the following heads: —

(*a*) Muscular steadiness and endurance.

(*b*) Power of resistance to cold or disease.

(*c*) Power of the will.

(*d*) Comments on this statement: The evil effects of alcoholic drinks come not from their use but from their abuse.

PHYSICS.

Take 1, 2 or 3.

1. **Mechanics.** In each of the following cases show by a diagram, with distances and forces so distinctly marked as to make the solution clear, how a power of 50 pounds may be made to sustain a weight of 150 pounds: —

(*a*) By means of a lever.

(*b*) By means of a wheel and axle.

(*c*) By means of a system of pulleys.

(*d*) Upon an inclined plane.

2. **Pneumatics.**

(*a*) The weight of the air and the cause of that weight.

(*b*) The barometer and its uses.

(*c*) Why the air rushes into the lungs when we inhale.

(*d*) When an air pump is removing the air from a receiver, what is always the volume of the air that is left in the receiver, and what principle does this fact illustrate?

3. **Sound.**

(*a*) Its production and transmission.

(*b*) Principles concerning the tones of strings (pitch, quality and loudness).

(*c*) One or two applications of these principles to musical instruments.

(*d*) The principle of the telephone.

CHEMISTRY.

Take 1, 2 or 3.

1. **Hydrogen.**

(*a*) Its principal characteristics.

(*b*) Its diffusive power, — what is meant by it, with an illustration.

(*c*) The oxy-hydrogen blowpipe, — its principle, the heat produced, the product of the combustion and how its flame may be made luminous.

(*d*) Explain the following statement, giving special attention to the italicized parts: —

Hydrogen dioxide is *very unstable*, and so makes a *good oxidizing agent;* it is much used in dentistry and surgery as a *germicide*, and in such use has the merit of leaving no residue but *water* and the *products of oxidation.*

2. **Oxides of Nitrogen.**

(*a*) Give the symbols and names of the five oxides.

(*b*) Compare these oxides with mixtures of the same elements in respect (1) to the number of possible oxides and the number of possible mixtures and (2) to the proportions of the elements in them.

(*c*) The law of multiple proportions as illustrated by these oxides.

(*d*) The characteristics of the best known mixture of nitrogen and oxygen as compared with those of any compound of the two.

3. **Carbon.**

(*a*) Its allotropic forms, — what they are, with a test that shows how they are essentially the same thing.

(*b*) The deoxidizing power of charcoal, — what is meant by it and under what condition it is exhibited.

(*c*) The disinfecting power of charcoal, — the property of charcoal on which it depends, with an illustration of its effectiveness.

(*d*) Let powdered bituminous coal be heated in an ignition tube and the gases collected over water. The general name of the gases collected, their combustibility and the products of their burning, the use made of such gases and the name of the residue in the tube.

BOTANY.

Take 1, 2 or 3.

1. **Description of a Plant.** Describe in botanical terms some of the characteristics of the plant furnished you by the examiner, following the general order of these heads: (*a*) the stem; (*b*) the leaf; (*c*) the floral envelopes; (*d*) the essential organs.

2. **Leaves.**

(*a*) The distinction between a simple leaf and a compound one, with sketches to show it.

(*b*) Draw a petiolate, stipulate, ovate, feather-veined leaf, with a cordate base and a serrate margin.

(*c*) Some peculiar forms or modifications of leaves.

(*d*) The work of leaves with special reference to water, oxygen and carbonic acid.

3. **The Pistil.**

(*a*) The simple pistil, — the names and positions of its parts and how its plan or ideal structure answers to a leaf.

(*b*) The compound pistil, — its plan or ideal structure, how that plan aids in determining the number of its various parts, and how variations from such numbers (as when there is but one cell when the plan suggests five) may be explained.

(*c*) An inferior ovary and a superior one, with a term descriptive of the calyx in each case.

(*d*) The fruit, — what it is botanically and how it is distinguished from certain so-called fruits, as the strawberry, blackberry, etc.

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V. Drawing and Music.

The candidate will take both Drawing and Music. Time for the entire paper, one hour.

DRAWING.

1. In the town square is a watering trough of granite made from a single block, six feet long, two feet three inches wide and one foot seven and one half inches thick. Make three views of this block, drawing to a scale of one inch to the foot. Make the dimensions on the drawing and state properly the scale.

2. Draw from the object a spray of some common plant.

Take either 3 or 4.

3. From an open book, a little below the level of the eye, make a truthful drawing which shall show one set of converging lines.

4. Sketch some object in the room in which you are sitting, as a desk, a chair, a cupboard, a mantel, a ventilator, or a window with plants.

Take either 5 or 6.

5. Draw from memory one of the following conventional ornamental units: an Egyptian lotus, a Greek anthemion, a Gothic fleur-de-lis.

6. Make a surface pattern for a piece of calico, using as a unit a conventional form of one of the leaves previously drawn.

MUSIC.

1. Do you read music or sing or play a musical instrument? Give some account of such musical training as you may have received.

2. Deal with as many of these points as you can in connection with the music passage that follows: —

(*a*) The clef, and its meaning.

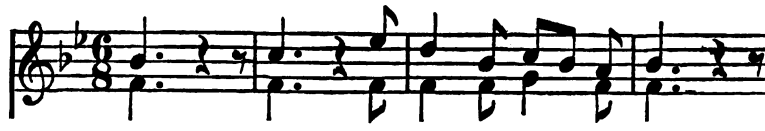
(*b*) The key, and why so called.

(*c*) The significance of the two flats.

(*d*) The names (letters), in order, of the upper notes.

(*e*) The measure, and why so called.

(*f*) The values of the rests in the first measure.



EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 23 AND 24, 1898.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Milton's *Paradise Lost*, Books I. and II.; Pope's *Iliad*, Books I. and XXII.; *The Sir Roger de Coverley Papers* in *The Spectator;* Goldsmith's *Vicar of Wakefield;* Coleridge's *Ancient Mariner;* Southey's *Life of Nelson;* Carlyle's *Essay on Burns;* Lowell's *Vision of Sir Launfal;* Hawthorne's *The House of the Seven Gables.* Add to the list other books of literary merit which you have read.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear, orderly and correct way.

(*a*) Either of the following: —
The Wrath of Achilles.
The Death of Hector.

(*b*) Either of the following: —
Some Traits of Roger de Coverley.
The Coverley Witch.

(*c*) Either of the following: —
Some Account of Goldsmith.
The Vicar of Wakefield in Prison.

(*d*) Either of the following: —

"My golden spurs now bring to me,
And bring to me my richest mail,
For to-morrow I go over land and sea
In search of the Holy Grail."

"God save thee, ancient Mariner,
From the fiends that plague thee thus!
Why look'st thou so?" — "With my crossbow
I shot the Albatross!"

(*e*) Either of the following: —

The Battle of Trafalgar.
Pandemonium.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other written work done in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

Study and Practice.

3. Tell what books of the following list you have critically studied: Shakespeare's *Macbeth;* Burke's *Speech on Conciliation with America;* DeQuincey's *Flight of a Tartar Tribe;* Tennyson's *The Princess.* Add to the list other books of literary merit which you have critically studied.

4. Take *one only* of the subjects (*a*), (*b*), (*c*) and (*d*) that follow, limiting yourself to the points suggested: —

(*a*) "The *terminus a quo* of this flight and the *terminus ad quem* are equally magnificent; the mightiest of Christian thrones being the one, the mightiest of Pagan the other. And the grandeur of these two terminal objects is harmoniously supported by the romantic circumstances of the flight."

Points to be considered: (1) Why the theme appealed to the author; (2) the truth and the fiction of the story; (3) the triple character of the enterprise as the author saw it; (4) the *terminus a quo* and the *terminus ad quem;* (5) the tragedy at the Lake of Tengis, or any other "romantic circumstance" of the flight.

(*b*) "Glamis thou art, and Cawdor, and shalt be
What thou art promis'd. Yet do I fear thy nature;
It is too full o' the milk of human kindness
To catch the nearest way: thou wouldst be great;
Art not without ambition, but without
The illness should attend it: what thou wouldst highly,
That wouldst thou holily; wouldst not play false,
And yet wouldst wrongly win: thou'dst have, great Glamis,
That which cries, *Thus thou must do*, if thou have it, —
An act which rather thou dost fear to do
Than wishest should be undone. Hie thee hither,
That I may pour my spirits in thine ear,
And chastise with the valor of my tongue
All that impedes thee from the golden round
Which fate and metaphysical aid doth seem
To have thee crown'd withal."

Points to be considered: (1) The speaker, and the occasion that prompts the speech; (2) *what thou art promised,* — the source, the nature and the effect of the promise; (3) the chief difference in character between Macbeth

and Lady Macbeth; (4) *the nearest way;* (5) *the illness should attend it;* (6) the reference in *that*, ninth line; (7) the antecedent of *act*, tenth line; (8) *the golden round;* (9) *fate and metaphysical end;* (10) the meaning in simple prose of the last sentence.

(*c*) Either of the following: —

(1) The prologue of *The Princess*, — its relation to the body of the poem, the picture it gives of the outing of the Institute, the occasion for Walter's question, "Where lives there such a woman now?" and the retort it provoked, Lilia's wish that led to the telling of the story, and features of the story that make it, in the poet's mind, a medley.

(2) Explanation of the expressions italicized in the following extract from the conclusion of *The Princess:* —

> Yet how to bind *the scattered scheme of seven*
> Together in one sheaf? What style could suit?
> The men required that I should give throughout
> The sort of mock-heroic gigantesque,
> With which *we bantered little Lilia first;*
> The women — and perhaps they felt their power,
> For something in *the ballads which they sang*,
> Or in their silent influence as they sat,
> Had ever seemed *to wrestle with burlesque*,
> And drove us, last, to quite *a solemn close* —
> They hated banter, wished for something real,
> A gallant fight, a noble princess — why
> Not make her true-heroic, true-sublime?
> Or all, they said, as earnest as the close?
> Which yet with such a framework scarce could be.
> Then rose a little feud between the two,
> Betwixt *the mockers* and *the realists;*
> And I, betwixt them both, to please them both,
> And yet to give the story as it rose,
> I moved as in *a strange diagonal*,
> And maybe neither pleased myself nor them.

(*d*) Unexaminable elements in literature, — features of a literary work or of its influence upon you, or of both, that it is hard, if not impossible, to reach through examination questions. You might make a distinction, for instance, between the sort of things the examiner may get a knowledge of from the candidate's answers to the questions of this English paper, and the sort of things the examiner may be left in the dark about even though the candidate's answers satisfy the questions. Perhaps by referring to the passage quoted from *Macbeth* under (*b*) you can illustrate a point or two of what you say.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read? Have you studied French or German? If so, to what extent?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Translate into idiomatic English:—*

Scio plerosque ita scripsisse, Themistoclem Xerxe regnante in Asiam transisse. Sed ego potissimum Thucydidi credo, quod et aetate proximus de iis qui illorum temporum historiam reliquerunt, et eiusdem civitatis fuit. Is autem ait ad Artaxerxen eum venisse atque his verbis epistulam misisse: "Themistocles veni ad te, qui plurima mala hominum Graiorum in domum tuam intuli, quam diu mihi necesse fuit adversum patrem tuum bellare patriamque meam defendere. Idem multo plura bona feci, postquam in tuto ipse et ille in periculo esse coepit. Nam cum in Asiam reverti vellet, proelio apud Salamina facto litteris eum certiorem feci id agi, ut pons quem in Hellesponto fecerat, dissolveretur atque ab hostibus circumiretur: quo nuntio ille periculo est liberatus. Nunc autem confugi ad te exagitatus a cuncta Graecia, tuam petens amicitiam: quam si ero adeptus, non minus me bonum amicum habebis quam fortem inimicum ille expertus est. Te autem rogo, ut de iis rebus quas tecum conloqui volo, annuum mihi tempus des eoque transacto ad te venire patiaris."

(*b*) *Translate into idiomatic English:—*

Iamque adeo super unus eram, cum limina Vestae
servantem et tacitam secreta in sede latentem
Tyndarida aspicio: dant clara incendia lucem
erranti passimque oculos per cuncta ferenti.
Illa sibi infestos eversa ob Pergama Teucros
et poenas Danaum et deserti coniugis iras
praemetuens, Troiae et patriae communis Erinys,
abdiderat sese atque aris invisa sedebat.
Exarsere ignes animo; subit ira cadentem
ulcisci patriam et sceleratas sumere poenas.
'Scilicet haec Spartam incolumis patriasque Mycenas
aspiciet, partoque ibit regina triumpho,
coniugiumque, domumque, patres, natosque videbit,
Iliadum turba et Phrygiis comitata ministris?
Occiderit ferro Priamus? Troia arserit igni?
Dardanium totiens sudarit sanguine litus?
Non ita: namque etsi nullum memorabile nomen
feminea in poena est, nec habet victoria laudem,
exstinxisse nefas tamen et sumpsisse merentis
laudabor poenas, animumque explesse iuvabit
ultricis flammae, et cineres satiasse meorum.'

— *Aeneid II.*, *567–587.*

French.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *Translate into idiomatic English:* —

Sectaires et philosophes, citoyens et soldats, parlement et peuple, tous, de gré ou de force, concouraient à grandir Cromwell, comme pour grandir avec lui; et les républicains de la cité de Londres, venus au-devant de lui pour le haranguer quand il rentrait dans leurs murs, se charmaient eux-mêmes en lui disant: "Vous étiez destiné à charger les rois de chaînes et à mettre leurs nobles dans les fers." Aveugles, qui ne se doutaient pas que bientôt ces fers pèseraient sur leurs propres mains!

Cromwell recevait ces hommages et ces grandeurs avec une humilité calculée, qui pourtant n'était pas dénuée de toute sincérité. "À Dieu seul, disait-il sans cesse, appartient la gloire; je ne suis que son faible et indigne instrument." Il savait combien ce langage convenait à son pays, à son parti. Il l'exagérait et le répétait sans mesure, pour complaire aux hommes dont il exaltait ainsi la confiance et le dévouement. Mais c'était aussi l'expression de sa propre et intime pensée. Dieu, sa puissance, sa providence, son action continue dans les affaires du monde et sur les âmes, ce n'étaient point là, pour Cromwell, de froides abstractions ou des traditions usées: c'était vraiment sa foi. — *Guizot.*

German.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:* —

Immer gewöhne sich der Mensch, zu denken: "Was Gott schickt, ist gut," es dünke ihm gut oder böse.

Ein frommer Weiser kam vor eine Stadt, deren Thore geschlossen waren; niemand wollte sie ihm öffnen. Hungrig und durstig musste er unter freiem Himmel übernachten. Er sprach: "Was Gott schickt, ist gut," und legte sich nieder.

Neben ihm stand sein Esel, zu seiner Seite eine brennende Laterne um der Unsicherheit willen in derselben Gegend. Aber ein Sturm entstand und löschte sein Licht aus, ein Löwe kam und zerriss seinen Esel. Er erwachte, fand sich allein und sprach: "Was Gott schickt, ist gut." Er erwartete ruhig die Morgenröte.

Als er an die Stadt kam, fand er die Thore offen, die Stadt verwüstet, beraubt und geplündert. Eine Schaar Räuber war eingefallen und hatte eben in dieser Nacht die Einwohner gefangen weggeführt oder getödtet. Er war verschonet. "Sagte ich nicht," sprach er, "dass alles, was Gott schickt, gut sei? Nur sehen wir meistens am Morgen erst, warum er uns am Abend etwas versagte." — *Herder.*

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 23 AND 24, 1898.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. A clock loses 30 minutes a day. It is set exactly right at noon. When the indicated time by this clock is 10 P.M. of the same day, what is the correct time? Give your reasoning.

2. How many shares of 5 per cent. stock at 120 must be bought to yield an income of $720? How much will they cost? Give your reasoning.

Take either 3 or 4.

3. The freezing and boiling points of the centigrade thermometer are respectively 0° and 100°; of the Fahrenheit, 32° and 212°. The temperature of the blood is about $98\frac{1}{2}^\circ$ by the Fahrenheit scale; what is it by the centigrade?

4. Draw two diagonals from any corner, as A, of a cube whose edge is 4, to the extremities of an opposite edge, as BC. What is the perimeter of the triangle ABC? Draw a diagram, lettering it properly and putting in the dimensions of the triangle.

ALGEBRA.

Take either 1 or 2.

1. If $y=\frac{1-z^2}{1+z^2}$ and $z=\frac{1-x}{1+x}$, express the value of y in terms of x, reducing that value to its simplest form.

2. When the smaller of two numbers is divided by the larger, the quotient is .2 with a remainder of .2. When the larger is divided by the smaller, the quotient is 4 with a remainder of 1. What are the numbers?

Take either 3 or 4.

3. A train travelling b miles an hour is m hours in advance of a second train which travels a miles per hour. In how many hours will the second train overtake the first? Discuss the result when $a=b$.

4. A sum of money at a given rate of interest for a given number of years yields, for principal and interest, a certain amount. Expressing the sum, the rate, the number of years and the amount by s, r, y and a respectively, —

(*a*) Write the equation for a.

(*b*) From the equation for a find y.

(*c*) Express in words the truth expressed in this value of y (that is, translate the formula for y into a rule).

(*d*) With the aid of the formula for y, find in how many years $400 at 4 per cent. will be doubled.

Take 5.

5. The area of a square may be doubled by increasing its length by 10 feet and its breadth by 3 feet. Find the side of the square.

GEOMETRY.

Take 1.

1. Draw a line from the vertex of the right angle of a right triangle to the middle point of the hypothenuse.

(*a*) What relation does this line bear to the halves of the hypothenuse?

(*b*) Prove this relation.

(*c*) Frame two or three theorems on the basis of this relation.

Take either 2 or 3.

2. (*a*) What is meant by the locus of a point? Give an illustration.

(*b*) What is the locus of the vertex of a triangle of constant area and constructed on a given line as a base? Give the geometrical principle involved.

(*c*) What is the locus of the vertex of the right angle of a right triangle constructed on a given line as a base? Give the geometrical principle involved.

3. The right triangle ABC is right-angled at B. Draw BD perpendicular to AC. The lengths of the sides AB, BC and AC are a, $a+1$ and $a+2$ respectively. Answer the following questions in terms of a, and give the geometrical principle on which each answer is based: —

(*a*) What is the length of AD?

(*b*) What is the length of BD?

(*c*) What ratio does the triangle ABD bear to the triangle ABC?

Take either 4 or 5.

4. Prove that a tangent is a mean proportional between a secant drawn from the same point and the part of the secant without the circle.

5. What is the area of a circle? Prove it by the method of limits.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 23 AND 24, 1898.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one number only.

2. *The Colonial Period in Massachusetts.*

(*a*) The Separatists and the Puritans, — how they differed in their attitude towards the established church, when and where they first made settlements, and what events in England finally checked their coming to Massachusetts.

(*b*) How the Puritans dealt with those whose opinions they condemned, with illustrations.

(*c*) The relations of the colonists to the Indians.

(*d*) The sway of Andros, — causes that led to it, the general character of it, and how it came to an end.

(*e*) Some characteristics or facts about the colonial period in Massachusetts not found in the provincial.

3. *The Constitution of the United States.*

(*a*) Some weaknesses or defects of government that led to the adoption of the Constitution.

(*b*) The problem of establishing satisfactory relations between the large States and the small in respect to their powers in Congress, and how the problem was solved.

(*c*) One or two powers granted by the Constitution to the United States, with reasons therefor.

(*d*) One or two powers denied to the United States, with reasons therefor.

(*e*) One or two powers denied to the States, with reasons therefor.

4. *The Rise and Fall of the Slave Power.* — Write a sentence or two on each of the following themes, with special reference to its bearing on the rise and fall of the slave power in the United States: —

(*a*) The ordinance of 1787.
(*b*) The cotton gin.
(*c*) The Missouri compromise.
(*d*) The Mexican war.
(*e*) The fugitive slave law.
(*f*) The Kansas-Nebraska bill.
(*g*) The Dred Scott decision.
(*h*) The election of Lincoln.
(*i*) The emancipation proclamation.

5. *The United States and Spain.* — Write about the relations of the United States and Spain in connection with each of the following topics, touching, incidentally, geographical aspects of these relations: —

(*a*) Florida.
(*b*) The Louisiana territory.
(*c*) The Philippine Islands.
(*d*) Santiago de Cuba.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 23 AND 24, 1898.

IV. — SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent. Under each science *take one number or topic only*, with its subdivisions. Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

1. *The Zones.*

(*a*) The boundaries of the zones, — what they are and how their positions are determined. Explain with the aid of a diagram.

(*b*) Two reasons why, though the sun is nearer to us in winter than in summer, our winter is colder than our summer.

(*c*) The seasons of the torrid zone, — what they are and how they are caused.

2. *The Agency of Water.*

(*a*) In wearing away the land, above ground and below, with explanations and illustrations.

(*b*) In transporting material and building up new lands, with explanations and illustrations.

(*c*) In favoring, changing or discouraging human industry through the foregoing processes, with illustrations.

PHYSIOLOGY AND HYGIENE.

1. *Respiration.*

(*a*) The structure of the lungs, and how it is adapted to the work that is done by them.

(*b*) How the blood is purified by respiration.

(*c*) How the air in close rooms becomes impure through respiration.

(*d*) Consequences of breathing impure air, and how they may be averted.

2. *The Microscopic Plants known as Bacteria.*

(*a*) The service in nature which they render.

(*b*) The relation they hold to fermentation, decay and disease.

(*c*) How foods may be preserved against their ravages.

(*d*) Hygienic precautions to reduce the danger of exposure to them.

PHYSICS.

1. *The Parallelogram of Forces.* — Suppose an attempt is made to row a boat at the rate of four miles an hour directly across a stream that flows at the rate of three miles an hour.

(*a*) Assuming that the velocity of the stream is uniform from bank to bank, determine the direction and velocity of the boat. Explain fully, referring to a diagram.

(*b*) Assuming that the velocity of the stream is three miles an hour at its centre only, but diminishes gradually and equally towards each bank, determine the general effect on the resultant motion of the boat. Would the boat, for instance, descend the stream as far as before? What sort of a course would it take? Explain fully, referring to a diagram.

2. *Gravitation and Weight.*

(*a*) The distinction between gravitation and weight.

(*b*) A discussion, in the case of a ball falling to the earth, of the ball's attraction for and motion towards the earth, as compared with the earth's attraction for and motion towards the ball.

(*c*) The distinction between the weight of a body and its mass, with illustrations to show how the one may vary when the other does not.

(*d*) The distance fallen and the final velocity of a body falling from a state of rest for four seconds.

3. *Electricity.* — Trace from beginning to end, through all the intermediate stages of its transformations, the energy that is developed from burning coal under a boiler until it is expended in moving, in lighting and in heating an electric car. Or, if the foregoing proves too difficult, describe in order, in the case of the telephone, the various transformations of energy from the voice of the speaker to the ear of the distant listener.

CHEMISTRY.

1. *Chemical Symbols and Equations.*

(*a*) Name each of the following: N_2O_5, NaOH, Na_2SO_4, CuCl, $Ag\,NO_3$.

(*b*) Write symbols for the following: oil of vitriol, lime, muriatic acid, common salt, the product of the combustion of hydrogen in chlorine gas.

(*c*) Write the chemical equation for the reaction that occurs when sulphuric acid is added to common salt.

(*d*) In the foregoing reaction, how many pounds of chlorohydric acid can be made from 100 pounds of salt (Na, 23; Cl, 35.5; S, 32; O, 16; H, 1)?

2. *Chlorine.*

(*a*) A method of preparing chlorine with the aid of MnO_2, and the formula for the reaction.

(*b*) Characteristic properties of the gas.

(*c*) Its affinity for hydrogen, with one or two illustrations, and how this affinity is utilized in bleaching processes.

(*d*) A comparison of chlorine with two other elements of the chlorine group, in respect to analogous properties.

3. *Fermentation.* — Describe an experiment to illustrate fermentation in both its stages, giving an account, —

(*a*) Of the gaseous product of the first stage, — what it is and how its presence may be tested.

(*b*) Of the liquid product of the first stage, — what it is, its affinity for water, and how it may be separated, both in part and in full, from the water that contains it.

(*c*) Of the product of the second stage.

(*d*) Of the preparation of bread by means of yeast, and how it resembles the first stage of fermentation.

Botany.

1. *Leaves.* — Write briefly about leaves under each of the following heads, illustrating some of your statements with drawings: —

(*a*) The veining of leaves.

(*b*) Simple and compound leaves.

(*c*) Leaf arrangement on the stem, and how it is related to the branching of the stem.

(*d*) Peculiar forms and uses of leaves.

2. *Fertilization of Flowering Plants.*

(*a*) The organs of fertilization and their structure.

(*b*) The essential feature in the fertilizing process.

(*c*) Self-fertilization, — what it is and how it is often thwarted.

(*d*) Cross-fertilization, — what it is and agencies that favor it.

3. *Description of a Plant.* — Describe in botanical terms some of the characteristics of the plant submitted to you for examination, adopting the following order: (*a*) the stem; (*b*) the leaf; (*c*) the floral envelopes; (*d*) the essential organs.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 23 AND 24, 1898.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour.

DRAWING.

Take either 1 or 2.

1. Make a pleasing sketch from memory or imagination of a tumbler of good proportions and shape, centrally placed, below the eye, on a rectangular block.

2. Make two views or working drawings of a gate post. Its base is a plinth 4′ square and 1′ 6″ high, on which stands a prism 3′ square and 9′ high. The prism is centrally surmounted by a sphere 3′ in diameter. Draw to scale, indicating your scale and putting in the dimensions properly.

Take either 3 or 4.

3. Sketch from nature some twig or branch with leaves or flowers or both. Conventionalize the leaves or flowers or both, and use them in a centre design.

4. Draw two or three units of historic ornament, and name them. Show, by illustration as well as by description, how a border may be composed from one or more of them.

Take either 5 or 6.

5. Give any simple and rapid illustrations you please, from available objects about you (books, desks, vases, fruits, flowers, window views, etc.), of your proficiency in drawing.

6. Write about color under the following heads: —

(*a*) The six leading normal colors, with the six intermediate colors, in order.

(*b*) Hues, tints, shades, tones and scales of color, — definitions and illustrations.

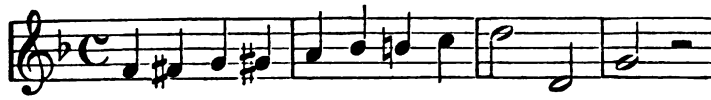
(*c*) Harmony of colors, with illustrations from the flowers and the foliage of the buttercup, the white lilac and the red rose.

Music.

1. Do you read music or sing or play a musical instrument? Give some account of such musical training as you may have received.

2. What is your view of the desirability of some acquaintance with music on the part of the teacher?

3. Interpret at least four of the marks or symbols in the following: —



EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 6 AND 7, 1898.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Milton's *Paradise Lost*, Books I. and II.; Pope's *Iliad*, Books I. and XXII.; *The Sir Roger de Coverley Papers* in *The Spectator*; Goldsmith's *Vicar of Wakefield*; Coleridge's *Ancient Mariner*; Southey's *Life of Nelson*; Carlyle's *Essay on Burns*; Lowell's *Vision of Sir Launfal*; Hawthorne's *The House of the Seven Gables*. Add to the list other books of literary merit which you have read.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear, orderly and correct way.

(*a*) Either of the following: —

A parallel between Pope and Milton, — the times in which they lived, their religious views, their political sympathies, their character as men, their traits as writers of English, their originality, as shown in the *Iliad* of the one and the *Paradise Lost* of the other, or any respects in which resemblances or contrasts between them can be shown.

A parallel between Pope's *Iliad* and Milton's *Paradise Lost*.

(*b*) Either of the following: —

The Coverley Sabbath, — how Sir Roger promoted its observance

The Coverley Hunt, — its author, how his work compares with Addison's, and one or two glimpses he gives of Sir Roger as a hunter.

(*c*) Either of the following: —

The Vicar of Wakefield, "simple in affluence and majestic in adversity."
Oliver Goldsmith, — his strength and his weakness.

(*d*) Either of the following: —

Two or three of Carlyle's views about Burns as a poet.
Two or three of Carlyle's views about Burns as a man.

(*e*) Either of the following: —

Hepzibah Pyncheon as a Shopkeeper.
The House of the Seven Gables, — some glimpses it gives of Hawthorne as a writer or a man.

(*f*) Either of the following: —

Sir Launfal and the Leper.
The Holy Grail, — Sir Launfal's vain search for it and where he found it at last.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other work written in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

Study and Practice.

3. Tell what books of the following list you have critically studied: Shakespeare's *Macbeth*; Burke's *Speech on Conciliation with America*; DeQuincey's *Flight of a Tartar Tribe*; Tennyson's *The Princess*. Add to the list other books of literary merit which you have critically studied.

4. Take *one only* of the subjects (*a*), (*b*) and (*c*) that follow: —

(*a*) The sleep-walking scene in *Macbeth*, — the circumstances, the action of Lady Macbeth, the things she was impelled to talk about, the scene as a revelation of mental distress, the effect upon her attendants, the contrast between Lady Macbeth's words before the deed that disturbs her and her bearing after it, her husband's bearing before and after as compared with her own, other instances in *Macbeth* of the "false creations" of a perturbed spirit, Shakespeare's art in showing the workings of conscience, etc.

(*b*) Either of the following: —

(1) Burke's speech on *Conciliation with America*, — your method of studying it, some of the points or topics which you considered in connection with it, and the impressions you have gained from it of Burke as a

man and an orator. Indicate, in particular, whether, in connection with such study, you gave serious thought to such things as the essentials of argumentative composition, the laws of the paragraph and the relative effects of abstract and concrete statements; also whether you tried to find out for yourself, from your own analysis, the structure and order of Burke's plan, or relied for your knowledge of that plan on the analysis of another.

(2) First, sir, permit me to observe that the use of force alone is but temporary. It may subdue for a moment, but it does not remove the necessity of subduing again; and a nation is not governed which is perpetually to be conquered. My next objection is its uncertainty. Terror is not always the effect of force, and an armament is not a victory. If you do not succeed, you are without resource; for, conciliation failing, force remains; but force failing, no further hope of reconciliation is left. A further objection to force is that you impair the object by your very endeavors to preserve it. The thing you fought for is not the thing you recover, but depreciated, sunk, wasted and consumed in the contest. Nothing less will content me than whole America. Lastly, we have no sort of experience in favour of force as an instrument in the rule of our colonies. Their growth and their utility have been owing to methods altogether different. Our ancient indulgence has been said to be pursued to a fault. It may be so. But we know, if feeling is evidence, that our fault was more tolerable than our attempt to mend it; and our sin far more salutary than our penitence.

Points to be considered: —

(1) The foregoing passage from Burke's *Conciliation with America* is purposely set up in violation of a fundamental law of the paragraph. Show clearly wherein the violation consists.

(2) If you think the passage should be broken up or divided, how many divisions would you make, where would you make them, and why?

(3) What do you understand by unity in a paragraph? Illustrate from any paragraph you find in the foregoing passage.

(4) The passage purposely omits a few sentences from the original. On the other hand, Burke might easily have added a few sentences. Whether unity suffers or not in such cases is dependent on what? In what ways might a paragraph gain or lose through such changes and yet respect the law of unity?

(5) What do you understand by climax in a paragraph or a series of paragraphs? Illustrate from the foregoing passage.

(*c*) Any one of the following: —

(1) The songs between the cantos of *The Princess*, — the themes with which they deal, two or three characteristics common to them, how they differ in their spirit from the spirit shown by Princess Ida in her University, why they have a place in the poem, etc. Close your writing by quoting one of the poems from memory, or, at least, a stanza from one of them.

(2) The child in *The Princess*,—an episode or two in which the child is prominent, the influence of the child on "the crust of iron moods," the ending of the story and the hand the child unwittingly has in that ending, how the child proves to be, in fact, as Tennyson himself says, the true heroine of the poem, and how the poems between the cantos bear out that view.

(3) Explanation of the ten expressions italicized in the following extract from *The Princess*:—

> I ceased, and all the ladies, each at each,
> Like *the Ithacensian suitors* in old time,
> Stared with great eyes, and laughed *with alien lips*,
> And knew not what they meant; for still my voice
> *Rang false*; but smiling, 'Not for thee,' she said,
> 'O *Bulbul*, any rose of *Gulistan*
> Shall *burst her veil*; marsh-divers, rather, maid,
> Shall croak thee sister, or the *meadow-crake*
> *Grate her harsh kindred* in the grass; and this
> A mere love-poem! O for such, my friend,
> We hold *them* slight; they mind us of *the time*
> *When we made bricks in Egypt*.'
>
> —*Part IV, 99-110.*

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Translate into idiomatic English*:—

Cum esset Caesar in citeriore Gallia, crebri ad eum rumores adferebantur. Litteris item Labieni certior fiebat omnes Belgas contra populum Romanum coniurare obsidesque inter se dare. Coniurandi hae erant causae: primum verebantur ne ad se exercitus noster adduceretur; deinde ab nonnullis Gallis sollicitabantur. Hi Germanos diutius in Gallia versari noluerant et populi Romani exercitum hiemare atque inveterascere in Gallia moleste ferebant. Nonnulli mobilitate et levitate animi novis imperiis studebant. Ab nonnullis etiam sollicitabantur, quod in Gallia a potentioribus atque iis qui ad conducendos homines facultates habebant, vulgo regna occupabantur; qui minus facile eam rem imperio nostro consequi poterant.

Translate into Latin:—

There are in Gaul some very powerful men who commonly administer the government. They fear that under Roman rule they cannot so easily do this thing. Hence they are unwilling that the Roman army shall be led into their land.

(*b*) *Translate into idiomatic English :—*

Dividimus muros et moenia pandimus urbis.
Accingunt omnes operi, pedibusque rotarum
Subjiciunt lapsus, et stuppea vincula collo
Intendunt. Scandit fatalis machina muros,
Feta armis. Pueri circum innuptæque puellae
Sacra canunt, funemque manu contingere gaudent.
Illa subit, mediaeque minans illabitur urbi.
O patria, o divum domus Ilium, et inculta bello
Moenia Dardanidum! quater ipso in limine portae
Substitit, atque utero sonitum quater arma dedere;
Instamus tamen immemores caecique furore,
Et monstrum infelix sacrata sistimus arce.

— *Æneid II., 234–245.*

Tell the story of which the passage is a part.

FRENCH.

1. Tell what you have done in the study of French,—the time spent, the authors read, and so on.

2. *Translate into idiomatic English :—*

La nouvelle de la capitulation d'une armée anglaise devant les milices américaines produisit un grand effet en Europe. Elle décida la cour de France à traiter ouvertement avec les États-Unis.

Le Congrès américain avait reconnu de bonne heure la nécessité de chercher un appui et des secours au dehors. Silas Deane, puis Franklin, le représentèrent officieusement près la cour de Versailles, dont il s'agissait d'obtenir une coopération efficace. Franklin, déjà connu dans l'ancien monde par ses travaux scientifiques fut rapidement très populaire en France, et trouva le plus gracieux accueil auprès des grands comme auprès des écrivains, des philosophes et des savants. Il y avait dans tous les rangs de la nation un désir de revanche contre les défaites humiliantes de la dernière guerre, et ce sentiment faisait enflammer volontiers les gens pour la cause de populations qui voulaient devenir indépendantes de la Grande-Bretagne. L'entraînement fut irrésistible. L'occasion fut belle à tous les soldats de fortune. Les commissaires du Congrès étaient assaillis de demandes pour le service dans l'armée continentale: plus tard on fit quelque reproche à Silas Deane, même à Franklin, d'avoir trop aisément concédé grades, emplois, émoluments, à des étrangers qui ne rendirent point les services promis et furent parfois un sérieux sujet d'embarras.

— *Moireau.*

GERMAN.

1. Tell what you have done in the study of German,—the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:—*

Als der Bürgerkrieg am schlimmsten wüthete, kam ein Farmer aus der Umgegend von Richmond zu Lincoln, um sich über die Verwüstungen zu beklagen, welche die Soldaten der Union begangen hatten.

"Ich kann mich mit diesen Kleinigkeiten nicht aufhalten," sagte Lincoln, "zwanzig Präsidenten würden dafür nicht genügen."

"Geben Sie mir wenigstens eine Zeile an den Colonel Quincy," drängte der Farmer.

"Sie erinnern mich an eine kleine Geschichte," sagte Lincoln, "die einem Lootsen auf dem Flusse Illinois begegnete. Das Dampfschiff, welches er lenkte, war mitten in gefährlichen Stromschnellen; seine ganze Aufmerksamkeit war auf sein Steuerruder gerichtet. Da fühlte er sich am Rockschosse gezupft. 'Was giebt es?' sagte er, ohne nur den Kopf zu wenden. 'Herr Capitän,' sagte eine Kindesstimme, 'halten Sie doch das Boot eine Minute an, damit mein Ball, der mir ins Wasser gefallen ist, wieder herausgefischt werden kann'"

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 6 AND 7, 1898.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. Divide the greatest common divisor of 210 and 1,344 by the least common multiple of 7, 21, 28 and 56, and express the quotient decimally.

2. A man buys 400 tons of coal, each ton containing 2,240 pounds, at $4.25 per ton. He sells it for $4.25 per ton of 2,000 pounds. Express his profit first in dollars and then as a percentage

Take either 3 or 4.

3. The entire number of pupils belonging to a school on Monday was 155. The only changes in membership during the week were due to three permanent withdrawals at the close of Tuesday's session and four permanent accessions at the beginning of Friday's session. The pupils in actual attendance on Monday, Tuesday, Wednesday, Thursday and Friday numbered 150, 146, 147, 149 and 148 respectively. Present these facts neatly in a tabular form, show the averages properly, and determine the percentage of attendance for the week.

4. Two boatmen row down a stream that is a mile wide, starting from the same point on the right bank. The first rows one mile in a straight line close to the right bank. The second rows diagonally in a straight line to a point on the left bank exactly opposite the point reached by the first. Now if the second boatman claims that he has not only rowed down stream as far as the first, a distance of one mile, but has, in addition, crossed the stream, a distance of one mile, which the first did not do, and therefore has rowed two miles, or a mile more than the first, is his claim sound or fallacious? If the latter, what is the extent of his error?

ALGEBRA.

Take either 1 or 2.

1. Simplify $a-[2b+\{3c-3a-(a+b)\}+\{2a-(b+c)\}]$.

2. The sum of two numbers exceeds three times their difference by a and their difference is equal to one third of b. Find the numbers.

Take either 3 or 4.

3. The formula for the area of a circle is $a=\pi r^2$, a being the area, r the radius and π the ratio of the circumference to the diameter (3.14). From this equation find the formula for the diameter of the circle, and translate it into a rule. With the aid of the formula thus obtained work out the diameter of a circle whose area is 12.56 square feet.

4. Find the square root of $4x^2+9y^2+12xy+16x+24y+16$.

Take either 5 or 6.

5. What number is that whose cube exceeds its square by twice itself? Prove your work with each of the two answers obtained.

6. Find the value of x in $\sqrt{x}-\sqrt{x-5}=\sqrt{5}$.

GEOMETRY.

Take 1.

1. The sides of a scalene triangle in the order of their lengths (the shortest first) are a, b and c. Its altitudes, when its sides are successively used as bases, are 2, 3 and 4.

(a) Draw the triangle with its three altitudes, attaching to the proper lines the values assigned them.

(b) Give three expressions for the area of this triangle.

(c) What relationship, if any, do you discover between these altitudes and their respective bases?

Take either 2 or 3.

2. Prove the relationship that a line dividing two sides of a triangle proportionally holds to the third side.

3. Find the mean proportional between 4 and 9, (1) by the algebraic method and (2) by the geometric method.

Take either 4 or 5

4. What is the measure of the angle made by a tangent and a chord intersecting at the same point in the circumference of a circle? Demonstrate.

5. Give the successive area theorems, without demonstrating them, that lead up to and include the theorem that gives the area of a circle.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 6 AND 7, 1898.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one number only.

2. *The First Political Parties.*

(*a*) The Federalists, — why they were so named, the views or tendencies represented by them, and their sympathies in the war that raged between France and England.

(*b*) The Republicans, — how they differed with the Federalists in governmental policies.

(*c*) The Alien and Sedition laws, — what they were, the occasion for them, and how they contributed to the downfall of one of these parties.

(*d*) The most conspicuous of the early Federalists, with a brief account of him.

(*e*) The most conspicuous of the early Republicans, with a brief account of him.

3. *The War of 1812.*

(*a*) Causes of the war, — the trouble about seamen, the decrees of Napoleon and of England and our replies thereto, and how Napoleon deceived us.

(*b*) How the war affected the business and opinions of New England

(*c*) Our operations by land as contrasted with our operations by sea, with one or two illustrations of the contrast.

(*d*) How the war continued after the treaty of peace was signed and why.

(*e*) Things gained or settled by the war.

4. *The Development of the United States as affected by Considerations of Geography.* — Point out under each of the following heads some phase of national development that is closely connected with or dependent upon it: —

(*a*) Soil and climate as affecting productions

(*b*) The coast as related to commerce.

(*c*) Inland waters as related to commerce.

(*d*) Mineral resources as related to industries.

(*e*) Sites of great cities as determined by natural advantages.

5. *Recent Historical Matters.* — Give a brief account of each of the following: —

(*a*) The panic of 1873, — its causes and consequences.

(*b*) The electoral commission, — the occasion for its existence and the work it did.

(*c*) Specie payments, — what they are, why they were suspended, and how the government succeeded in resuming them.

(*d*) Civil service reform, — the evils it aims to stop, and how it seeks to stop them.

(*e*) The silver problem, — what it is, what led to its prominence, the two extremes of views as to the best methods of meeting it, and the present attitude of the government, as shown by its laws, in dealing with it.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 6 AND 7, 1898.

IV. — SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent. Under each science *take one number or topic only*, with its subdivisions. Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

1. *Rainfall.*

(*a*) The cause of rain, — watery vapor, the air's capacity for it, the dew-point, what dust in the air has to do with rain, etc.

(*b*) The trade-winds, — what they are, and whether they yield rain or not, with reasons.

(*c*) Rainless regions, — one or two instances, and why they exist.

(*d*) The equatorial rain-belt, — what it is, its position with reference to the equator, and its relations to seasons in the tropics.

(*e*) Some characteristics of an eddying storm.

2. *Characteristic Contrasts between North America and South America.*

(*a*) In respect to coast line.

(*b*) In respect to mountain systems.

(*c*) In respect to inland waters.

(*d*) In respect to climate.

(*e*) In respect to productions.

PHYSIOLOGY.

1. *The Skin.*

(*a*) Its structure, vessels, various forms, etc.

(*b*) Its powers of excretion and absorption.

(*c*) How it regulates the temperature of the body.

(*d*) How its action may be modified by heat, cold, burns, fright, etc.

(*e*) Uncleanliness of the skin,— contributions to it from within and without, ways in which it affects health, the necessity of frequent ablutions.

2. *The Lungs.*

(*a*) Some account of their structure.

(*b*) The mechanics of respiration.

(*c*) The function of respiration.

(*d*) Experiments to show that expired air is warm, moist and charged with carbon dioxide.

(*e*) Some effects either of alcohol or of tobacco on the structure and efficiency of the lungs.

PHYSICS.

1. *The Pressure of Liquids.*

(*a*) Some of the laws obeyed by a liquid at rest and exerting pressure in consequence of its own weight.

(*b*) The advantage taken of one or more of these laws in the hydrostatic press, the artesian well, the pipes of a water system, etc.

(*c*) The buoyant force of water upon a body immersed in it,— its cause, its measure, and how the principle is used in determining the specific gravity, say, of iron.

(*d*) Swimming in salt water as compared with swimming in fresh, with the reason for any difference noted.

(*e*) The hydrometer,— what it is, its general use, and how it may be graduated or fitted for special uses.

2. *Two Types of Energy.*

(*a*) The distinction between kinetic energy and potential, with an illustration of each in the case of a stone thrown directly upwards into the air.

(*b*) The energy of a machine,— its possible sources, with illustrations, the relation of the machine to this energy, why the machine keeps going a little while after its supply of energy has been cut off.

(*c*) The work done by the machine,— the useful and the useless, and how their sum is related to the energy originally imparted to the machine.

(*d*) The correlation of energy,— the meaning, with an illustration.

(*e*) The concentration of energy,— the meaning, with an illustration.

3. *The Electric Current.*

(*a*) How a cell may be arranged to produce an electric current, with diagram.

(*b*) Conditions that strengthen such a current and conditions that weaken it.

(*c*) The effect of a rapidly interrupted current upon an electro-magnet, and the general use to which the principle is put.

(*d*) The reverse of the foregoing principle, and the general use to which it is put.

(*e*) Some thermal effects of the current.

CHEMISTRY.

1. *The Nature of Flame.*

(*a*) Compare the flame of the Bunsen burner when the air valve is shut with the flame when the air valve is open, and explain the difference.

(*b*) How can you show that the flame of the Bunsen burner is hollow or restricted to an outer mantle? Why is it hollow?

(*c*) How can you show, with the aid of the Bunsen burner, the principle of the Davy safety lamp used by miners? Explain.

(*d*) Mention two products of combustion in the case of the Bunsen flame, and show how the presence of each may be tested.

(*e*) Why is it that wood burns partly with flame and partly without?

2. *Silver.*

(*a*) What do the numbers signify in the following cases: Ag, 108; Cu, 63.3; Na, 23; Cl, 35.4; N, 14?

(*b*) Dissolve a silver coin (it contains ten per cent. of copper) in nitric acid. Give the names and symbols of the salts that appear in the solution.

(*c*) How many ounces of silver nitrate can be made from one ounce of pure silver?

(*d*) Add a solution of common salt to a solution of silver nitrate and a white precipitate is formed. Give its name and symbol; also the formula for the reaction.

(*e*) What two properties of this white precipitate with reference to light and solubility lie at the foundation of the photographic process?

3. *Potassium.*

Potassium is obtained by distilling at a white heat an intimate mixture of its carbonate with charcoal, the products being potassium vapor and carbon dioxide. The condensed metal is collected under naphtha. The

bright surface exposed by cutting the metal promptly tarnishes in the air. When thrown upon water it moves about, enwrapped in a violet flame, until it disappears, whereupon the water shows an alkaline reaction.

(*a*) The formula for the reaction when potassium is manufactured.

(*b*) The collection of the metal under naphtha.

(*c*) The chemistry of the tarnishing.

(*d*) The changes, physical and chemical, that take place when the metal is thrown upon water.

(*e*) The alkaline reaction.

BOTANY.

1. *The Roots of Plants.*

(*a*) The essential distinction between the root and the stem, with illustrations of stems originating below ground and of roots originating above ground.

(*b*) Varieties of roots,—the tap root, fibrous roots and fascicled roots, with a sketch to illustrate each kind.

(*c*) The common beet, turnip or carrot,—why it is called a biennial plant, and how the root of the first year compares in function and characteristics with the root of the second year.

(*d*) The common potato and the sweet,—whether each is a root or a stem, and why.

(*e*) The functions of roots,—their selective power, the osmose of root hairs, etc.

2. *The Apple.*

(*a*) The fleshy part,—what it is, with the reason for so naming it.

(*b*) The central part,—what it is, why it is so called, whether it is simple or compound, and why, etc.

(*c*) Botanical terms that describe the position of each of these parts with reference to the other.

(*d*) Inferences that may be safely drawn from the central part of the apple about the styles and stigmas of the flower.

(*e*) Some relatives of the apple, with one or two signs of their relationship.

3. *Description of a Plant.*—Describe in botanical terms some of the characteristics of the plant submitted to you for examination, adopting the following order: (*a*) the stem; (*b*) the leaf; (*c*) the floral envelopes; (*d*) the essential organs.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 6 AND 7, 1898.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour, — an average of ten minutes for each of the six topics required.

DRAWING.

1. Tell briefly what you have done in drawing, — what branches of the subject you have studied, how much time you have given to them separately or in the aggregate, etc.

Take either 2 or 3.

2. A watering trough is made from a granite block that is 5 feet long, 2 feet wide and 18 inches thick. Make three views or working drawings of this block, using a scale of one half inch to the foot. Indicate the scale, name the views and put in the dimensions properly.

3. Sketch the foregoing trough, assuming it to be in angular perspective and far enough below the eye to show a portion of the water surface within. Bring out the thickness of the trough walls or sides, and shade so much of the water as is visible.

Take either 4 or 5.

4. Make an outline sketch of a group of two or more objects in your vicinity, or of your own arrangement, or set before you by the examiner (a cube, a cylinder, a cone, a block of any kind, a book, a tumbler, a vase, a bottle, an ink eraser, a crayon, a flower pot, a desk, a chair, a corner of the room, etc.).

5. Sketch from nature some twig or branch with leaves or with leaves and flowers. Conventionalize such parts of the specimen as you choose, and use these parts in some design for a centre piece or a border.

Take either 6 or 7.

6. Draw from memory one of the following conventional ornamental units, naming the unit you select: the Egyptian lotus, the Greek anthemion, the Gothic fleur-de-lis.

7. What is meant by the complement of a color? Give at least two illustrations. Suggest ways in which a knowledge of complementary colors may be valuable to people.

Music.

1. Do you read music or sing or play a musical instrument? Give some account of such musical training as you may have received.

Take either 2 or 3.

2. Rule neatly a staff of four measures or bars, place properly upon it the G clef, the signature of one sharp and the direction that each measure shall contain three quarter notes or their equivalent, and then fill out the measures correctly, so far as time values are concerned, with notes of various lengths. (A melodious result is desirable, though not essential for the purposes of this exercise.)

3. Sing either the scale or some passage selected either by yourself or by the examiner. (The examiner may test the voices of candidates individually or in groups, with or without musical accompaniment, as conditions suggest.)

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 22 AND 23, 1899.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Dryden's *Palamon and Arcite;* Pope's *Iliad*, Books I., VI., XXII. and XXIV.; *The Sir Roger de Coverley Papers* in *The Spectator;* Goldsmith's *Vicar of Wakefield;* Coleridge's *Ancient Mariner;* De Quincey's *The Flight of a Tartar Tribe;* Cooper's *The Last of the Mohicans;* Lowell's *Vision of Sir Launfal;* Hawthorne's *The House of the Seven Gables.*

Add to the list other books of literary merit which you have read.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear, orderly and correct way.

(*a*) Either some account of Homer's *Iliad* or of Pope's translation of it.

(*b*) Any theme from *The Sir Roger de Coverley Papers;* as, for example, Sir Roger himself, or the Coverley Sabbath and how Sir Roger promoted its observance, or the Coverley Witch and Sir Roger's attitude towards her.

(*c*) The author of *The Vicar of Wakefield.*

(*d*) "With his crossbow he laid full low
The harmless albatross."

(*e*) *The Flight of a Tartar Tribe,* — such an account of the book as might be written to a friend who has not read it, and who wishes to know what it is about and whether it is worth reading or not.

The candidate may substitute for *The Flight of a Tartar Tribe* any book he has read in his school literature course outside of the books prescribed for admission to the normal school.

(*f*) Any theme from *The Last of the Mohicans;* as, for example, the times, places and events that form the historic background of the story, or Indian traits as depicted by Cooper, or a description of David Gamut, or David's safety among hostile Indians and the secret thereof.

(*g*) *The Vision of Sir Launfal*, — its central thought, how it is presented in Part I., how in Part II., the mood or spirit of each prelude and how it is related to the part it introduces.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other work written in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

Study and Practice.

3. Tell what books of the following list you have critically studied: Shakespeare's *Macbeth*; Milton's *Paradise Lost*, Books I. and II.; Burke's *Speech on Conciliation with America*; Carlyle's *Essay on Burns*.

Add to the list other books of literary merit which you have critically studied.

4. Take *one only* of the subjects (*a*), (*b*), (*c*), (*d*) and (*e*) that follow, limiting yourself to the points suggested:—

(*a*) "Glamis, and thane of Cawdor!
The greatest is behind. . . .
. . . Two truths are told,
As happy prologues to *the swelling act*
Of the imperial theme. . . .
This supernatural soliciting
Cannot be ill, cannot be good: if ill,
Why hath it given me *earnest of success*,
Commencing in a truth? — I'm thane of Cawdor:
If good, why do I yield to *that suggestion*
Whose horrid image doth unfix my hair
And make my seated heart knock at my ribs,
Against the use of nature? Present fears
Are less than horrible imaginings:
My thought, *whose murder yet is but fantastical*,
Shakes so my single state of man, that *function*
Is smothered in surmise, and nothing is
But what is not."

Points to be considered: (1) The speaker and the occasion or events that prompted the speech; (2–8) The explanation of the italicized passages.

(*b*) "Nathless he so endured, till on the beach
Of that inflamed sea he stood, and call'd
His legions, angel forms, who lay entranc'd
Thick as autumnal leaves that strew the brooks
In Vallombrosa, where the Etrurian shades
High overarch'd imbower; or scatter'd sedge
Afloat, when with fierce winds Orion arm'd
Hath vex'd the Red Sea coast, whose waves o'erthrew
Busiris and his Memphian chivalry,
While with perfidious hatred they pursued
The sojourners of Goshen. . . ."

Points to be considered: (1) Milton's story of what precedes the event recorded in the passage; (2) Milton's story of what immediately follows; (3) The imagery of the passage; (4) *Nathless;* (5) *Entranc'd;* (6) Why *perfidious* hatred? (7) *The sojourners of Goshen;* (8) An account of the metre of *Paradise Lost.*

(*c*) Burke's *Speech on Conciliation with America* as a specimen of argumentative discourse.

(*d*) "The march of the human mind is slow. Sir, it was not until after two hundred years discovered that, by an eternal law, providence had decreed vexation to violence and poverty to rapine. Your ancestors did, however, at length open their eyes to the ill-husbandry of injustice. They found that the tyranny of a free people could of all tyrannies the least be endured, and that laws made against a whole nation were not the most effectual methods of securing its obedience. Accordingly, in the twenty-seventh year of Henry the Eighth the course was entirely altered. With a preamble stating the entire and perfect rights of the Crown of England, it gave to the Welsh all the rights and privileges of English subjects. . . . From that moment, as by a charm, the tumults subsided; obedience was restored; peace, order and civilization followed in the train of liberty. When the day star of the English Constitution had arisen in their hearts, all was harmony within and without—

—'simul alba nautis
Stella refulsit,
Defluit saxis agitatus humor;
Concidunt venti, fugiuntque nubes,
Et minax (quod sic voluere) ponto
Unda recumbit.'"

Points to be considered: (1) Whether or not the foregoing paragraph respects the principle of unity, with the reason for your opinion; (2) Whether or not it respects the principle of proportion, with the reason for your opinion; (3) Whether or not it respects the principle of sequence, with the reason for your opinion; (4) The translation of the Latin passage; (5) The distinction between tautology and redundancy; (6) Whether or not Burke gives us in this paragraph a case of either when he expresses in Latin an idea twice previously expressed in English, with the reason for your opinion.

(*e*) Write a letter to a friend, in which you give some account of your study of Carlyle's *Essay on Burns.* Deal with the theme in your own way.

Hints: Points emphasized by the teacher in the instruction given; the teachable and the unteachable features of the essay; definite impressions left in the mind about Burns as a man or as a poet, or about Carlyle as a writer, or about the essay as a masterpiece of English; impressions that abide in the mind and impressions that fade away with the lapse of time; experiences of profit and pleasure from the reading, or experiences of a contrary kind.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read? Have you studied French or German? If so, to what extent?

2. Take either (*a*) or (*b*), but not both.

(*a*) *How Coriolanus was persuaded to spare Rome.*

Translate into idiomatic English:—

Coriolanus, maximi vir animi, et altissimi consilii, optimeque de Republica meritus, iniquissimae damnationis ruina prostratus, ad Volscos, infestos tunc Romanis, confugit. Magno ubique pretio virtus aestimatur. Itaque, quo latebras quaesitum venerat, ibi brevi summum adeptus est imperium: evenitque, ut [eum] quem pro se salutarem imperatorem cives habere noluerant, paene pestiferum adversus se ducem experirentur. Frequenter enim fusis exercitibus nostris, victoriarum suarum gradibus, aditum juxta moenia urbis Volsco militi struxit. Missi ad eum deprecandum legati nihil profecerunt. Missi deinde sacerdotes, cum infulis, aeque sine effectu redierunt. Stupebat senatus; trepidabat populus: viri pariter ac mulieres exitium imminens lamentabantur.

Tunc Veturia, Coriolani mater, Volumniam uxorem ejus, et liberos, secum trahens, castra Volscorum petiit. Quam ubi filius adspexit, "Expugnasti," inquit, "et vicisti iram meam, patria, precibus hujus admotis; cujus amori te, quamvis merito mihi invisam, dono." Continuoque Romanum agrum hostilibus armis liberavit.

Translate into Latin:—

Coriolanus, through affection for his mother, said he would subdue his wrath and spare Rome. And immediately it came to pass that Rome was freed from the Volscian soldiery.

(*b*) *Dido's banquet to Aeneas, and how she entertained her guest.*

Translate into idiomatic English:—

Cithara crinitus Iopas
personat aurata, docuit quem maximus Atlas.
Hic canit *errantem* lunam solisque *labores;*
unde hominum genus et pecudes; unde imber et ignes;
Arcturum *pluviasque* Hyadas geminosque Triones;
quid tantum oceano *properent se tinguere* soles
hiberni, vel quae tardis mora noctibus obstet.
Ingeminant plausu Tyrii Troesque sequuntur.
Nec non et vario noctem sermone trahebat
infelix Dido, longumque bibebat amorem,
multa super Priamo rogitans, super Hectore multa;
nunc quibus Aurorae venisset filius armis,
nunc quales Diomedis equi, nunc quantus Achilles.
"Immo age, et a prima dic, hospes, origine nobis
insidias," inquit, "Danaum, casusque tuorum,
erroresque tuos; nam te iam septima portat
omnibus errantem terris et fluctibus aestas"

— *Aeneid I., 740–756.*

What is the significance or justification of the italicized words in the foregoing passage?

FRENCH.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *How the Cavaliers and Puritans carried on civil war.*

Translate into idiomatic English: —

Dans une société ainsi organisée et disposée, la guerre civile n'avait rien d'inouï ni d'impraticable. Elle couvrit bientôt le pays tout entier, tantôt commandée par les agents du roi ou du parlement, tantôt spontanément soulevée par les citoyens, et soutenue des deux parts avec une énergie triste souvent, mais sans hésitation, comme l'exercice d'un droit et l'accomplissement d'un devoir. L'un et l'autre parti avait un sentiment profond de la justice et de la grandeur de sa cause. L'un et l'autre faisait, pour la servir, ces efforts et ces sacrifices qui élèvent les âmes au moment même où elles s'égarent et qui donnent à la passion les apparences et quelquefois les mérites de la vertu. La vertu même ne manquait point à l'un ni à l'autre parti. Violents et licencieux, les Cavaliers avaient pourtant dans leurs rangs les plus beaux modèles de ces mœurs grandes et généreuses des anciennes familles, pleines de dévouement sans exigence et de dignité dans la soumission. Les Puritains, orgueilleux et durs, rendaient à leur patrie un service inappréciable; ils y fondaient l'austérité de la vie privée et la sainteté des mœurs domestiques. Les deux partis se combattaient avec acharnement, mais sans abdiquer, au sein de la lutte, tous les sentiments des temps d'ordre et de paix. Point d'émeutes sanguinaires, point de massacres judiciaires. C'était la guerre civile ardente, obstinée, pleine de violences et de maux, mais sans excès cyniques ou barbares, et contenue, par les mœurs générales de la population, dans certaines limites de droit et d'humanité. — GUIZOT' *Discours sur l'Histoire de la Révolution d'Angleterre.*

Translate into French: —

When Guizot was twenty-five years old, he was appointed (*designer*) by M. de Fontanes to the chair of history at the Sorbonne. Fontanes almost bade him to praise (*louer*) the Emperor in his inaugural lecture (*leçon*). "I will not do it," said Guizot; "take back (*reprendre*) the chair which you have given me; I do not love the Emperor; I will not praise him."

GERMAN.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:* —

Es war ein kalter strenger Winter. Da sammelte die kleine Minna, die einzige Tochter wohlthätiger Eltern, die Krümchen und Brosamen, die übrig bleiben, und bewahrte sie. Da ging sie hinaus zweimal des Tages auf den Hof und streute die Krümchen hin. Und die Vögel flogen herbei und pickten sie auf. Dem Mädchen zitterten aber die Hände vor Frost in

der bitteren Kälte. Da belauschten sie die Eltern und freuten sich des lieblichen Anblicks und sprachen: "Warum thust du das, Minna?"

"Es ist ja alles mit Schnee und Eis bedeckt," antwortete Minna, "dass die Thierchen nichts finden können; nun sind sie arm. Darum füttere ich sie, so wie die reichen Menschen die armen unterstützen und ernähren."

Da sagte der Vater: "Aber du kannst sie doch nicht alle versorgen."

Die kleine Minna antwortete: "Thun denn nicht alle Kinder in der Welt wie ich, so wie auch alle reichen Leute die armen verpflegen?"

Der Vater aber blickte die Mutter an und sagte: "O du heilige Einfalt!"

—KRUMMACHER.

Translate into German: —

What was the name of the little girl? What did she do? She gave crumbs to the little birds. Who saw her? Her father and mother saw her.

(a)

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 22 AND 23, 1899.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. How many times does the least common multiple of 126, 210 and 462 contain the greatest common divisor of the same numbers?

Do the work by factoring the numbers and inspecting the factors.

2. A owns $\frac{3}{11}$ of a mine. He sells $\frac{9}{10}$ of his share for $27,000. B, who owns $\frac{3}{8}$ of the same mine, sells $\frac{5}{9}$ of his share at the same rate. What does B sell for?

Do the work by analysis, but as concisely as possible.

Take either 3 or 4.

3. $450.75. BOSTON, Jan. 14, 1899.

Ninety days from date, I promise to pay to the order of John Doe four hundred fifty and $\frac{75}{100}$ dollars, value received.

Payable at the Merchants' Bank.

RICHARD DOE.

The foregoing note was discounted January 31 at 5 per cent.

Find (1) the date of maturity, (2) the number of days for which discount is computed, (3) the discount and (4) the proceeds.

4. When an express train goes a mile a minute, how many kilometres per hour does it go? $1^{km} = 1{,}000^{m}$; $1^{m} = 39.37$ inches.

ALGEBRA.

Take either 1 or 2.

1. Find the value of $a - \left\{ b - [-c + a - (a - b) - c] \right\}$ when $a = \frac{1}{2}$, $b = -1$ and $c = 2$.

2. Factor the following and determine by inspection their greatest common divisor: $abx^2 - 4\,ab,\ ^2x - 3\,x - 10,\ x^2 - 7\,x + 10,\ bx^2 - 25\,b$.

Take either 3 or 4.

3. The sum of two numbers is $\frac{a+b}{2}$. Twice the larger increased by a equals three times the smaller.

Find the *larger* number, using but *one* unknown quantity.

Find the *smaller* number, using *two* unknown quantities.

4. Simplify $\dfrac{\dfrac{a}{a-x} - \dfrac{a}{a+x}}{\dfrac{x}{a-x} + \dfrac{x}{a+x}}$.

Take either 5 or 6.

5. A sum of money at simple interest amounted in 4 years to $2,480 and in 5 years to $2,600.

Find the sum and the rate of interest.

6. The sum of two numbers is s and their product is p.

(*a*) Find the larger number.

(*b*) With the aid of the formula thus obtained find the larger number when the sum is 19 and the product 34.

Geometry.

Take either 1 or 2.

1. A B C is a right triangle. The hypotenuse B C is twice as long as the leg A B. What is the value of each acute angle? Give the proof.

2. Prove that any quadrilateral the opposite sides of which are equal is a parallelogram.

Take either 3 or 4.

3. In the triangle A B C draw D E parallel to B C. Show that A B and A C are divided proportionally.

4. Answer the following questions: —

(*a*) Only what kind of parallelograms can be inscribed in a circle?

(*b*) What is the locus of the vertices of all right triangles that can be constructed on a given line as an hypotenuse?

(*c*) What is the altitude of an equilateral triangle whose side is a? Express the answer in the simplest form.

(*d*) What is the distance of the chord b from the centre of a circle whose radius is a?

Take either 5 or 6.

5. Given an inscribed regular polygon whose number of sides is indefinitely increased.

(*a*) The limit of its apothem?

(*b*) The limit of its perimeter?

(*c*) The limit of the polygon?

(*d*) The use made of these limits in determining the area of a circle?

(*e*) The four figures in order whose areas need to be successively proved before proving the area of a circle?

6. Show how to find a fourth proportional to three lines that are 4, 6 and 8 long respectively, but do not prove that your construction is correct.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 22 AND 23, 1899.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one number only.

1. *The Territorial Possessions of the United States.* — For the purposes of this topic, all the possessions of the United States, whether temporary or permanent, that are outside of the States, may be regarded as territories.

(*a*) Illustrations of the ways in which new territory has come to the United States.

(*b*) The territories as they stand to-day.

(*c*) How a territorial government is usually distinguished from that of a State.

(*d*) Problems specially raised by recent territorial acquisitions, if such acquisitions are to be viewed as on their way to Statehood.

2. *The Relation of Certain Historic Facts to the Rise and Fall of the Slave Power.* — Write a sentence or two on each of the following themes, with special reference to its bearing on the rise and fall of the slave power in the United States: —

(*a*) The ordinance of 1787.
(*b*) The cotton gin.
(*c*) The Missouri compromise.
(*d*) The Mexican war.
(*e*) The fugitive slave law.
(*f*) The Kansas-Nebraska bill.
(*g*) The Dred Scott decision.
(*h*) The election of Lincoln.
(*i*) The emancipation proclamation.
(*j*) The fifteenth amendment.

3. *The Spanish War.*

(*a*) The causes that led to the Spanish war.

(*b*) The chief or decisive events of the war.

(*c*) The consequences of the war, as determined by the treaty of peace.

(*d*) The issue between imperialism and anti-imperialism.

4. *The Relation of Mining Industries to the Country's Growth.*

(*a*) The chief mineral products of the United States, and the sections where they abound.

(*b*) Ways in which mining industries affect the country's development.

(*c*) A concrete illustration of such influence on the country's growth; that is, select some mining industry and tell how it is carried on, what demands it makes for capital, skill and labor, what impetus it gives to local growth, what contributions it makes or causes to be made to the development of the country at large, etc.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 22 AND 23, 1899.

IV. — SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent. Under each science *take one number or topic only*, with its subdivisions. Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

1. *A Storm in the United States.*

(*a*) The storm centre, — what it is, atmospheric pressure there as compared with the pressure farther away, and how such pressure is determined.

(*b*) The wind of the storm, — its cause, and the condition to which it tends, as respects direction and velocity, at the storm centre and at varying distances from it.

(*c*) The rainfall of the storm, — its cause, and the conditions on which its quantity depends.

(*d*) The progress of the storm and its relation to weather predictions.

(*e*) How it happens that a storm reported as coming from the southwest may later strike Boston with northeasterly winds.

2. *Ocean Currents.*

(*a*) The paths and directions of five principal ocean currents.

(*b*) The relation of prevailing winds to these currents.

(*c*) How and why ocean currents affect climate, with one or two illustrations.

(*d*) The Gulf stream.

3. *Mountains.*

(*a*) Origin of materials of which mountains are composed.

(*b*) Account for mountain elevation.

(*c*) Explain irregularity of mountain surface.

(*d*) Explain mountain temperatures, and account for the snow cap and glaciers of high mountains

(*e*) Influence of mountains on rainfall.

Physiology and Hygiene.

Food and Digestion. — Starting with a mouthful of bread and butter, describe the successive steps or processes in the digestion and absorption of the three classes of food it contains. Deal (1) with what goes on in the mouth, (2) with what goes on in the stomach, and (3) with what goes on in the intestines.

The Skin.

1. Its position, structure and general use.
2. Distribution and use of the sweat glands.
3. Modifications of the skin in different parts of the body.
4. Uses of the skin as an organ of touch and temperature.
5. Necessity of keeping the skin clean.

Fatigue. An illustration or two, preferably from your own experience or observation, (*a*) of fatigue from over-exertion, (*b*) of fatigue from dread or worry, (*c*) of fatigue from doing nothing, and (*d*) of fatigue from hunger.

Fatigue from automatic movements as compared with that from volitional movements; effect of fatigue on efficiency of work; methods of recuperation from the results of fatigue, and why they are effective, etc.

Physics.

1. *Laboratory Exercise.* — Find the specific gravity of the solid furnished you by the examiner.

Hold yourself ready to answer the examiner's questions about the general principles involved in specific gravity problems.

If a satisfactory notebook of experiments performed by you is submitted to the examiner, he may substitute any one of them for the foregoing exercise, and question you upon the substitute.

2. *Atmospheric Pressure.*

(*a*) Describe an experiment to illustrate atmospheric pressure.

(*b*) What causes the pressure?

(*c*) Tell how the pressure can be measured.

(*d*) With the aid of a diagram, give the construction and explanation of the common lifting pump.

3. *Water and Steam.*

(*a*) The force that has to be overcome in changing water to steam; how it is overcome; what kind of energy is used in overcoming it; the status of

such energy, or what has become of it, after it has done such work; and under what circumstances such energy may reappear.

(*b*) A comparison of the temperature of the steam with that of the boiling water from which it comes.

(*c*) A comparison of the boiling point of water at the level of the sea and the boiling point at the top of a mountain, with the reason for the difference.

(*d*) A comparison of the scalding that comes from a steam accident with that which comes from a boiling water accident, with the reason for the difference.

CHEMISTRY.

1. *Laboratory Exercise.* — Breathe into a test tube containing clear lime water until the liquid becomes turbid. Continue forcing the breath into the liquid until it becomes clear again.

Hold yourself ready to answer the examiner's questions about the facts, changes and principles involved in the reaction observed.

If a satisfactory notebook of experiments performed by you is submitted to the examiner, he may substitute any one of them for the foregoing exercise, and question you upon the substitute.

2. *Flame.*

(*a*) Explain, with the aid of a diagram, the structure, order of combustion and products of an ordinary coal gas flame.

(*b*) When does a flame for illuminating purposes require the use of a chimney, and why?

(*c*) Illustrations of materials that burn with a flame and of materials that burn without flame.

(*d*) What is the cause of luminosity in a flame? Illustrate with a Bunsen burner.

3. *Water.*

(*a*) The facts and reasoning upon which the symbol H_2O is based.

(*b*) The stability of water, — what is meant by it, what the cause of it is, and what the value of it is to the world.

(*c*) The solvent power of water, with illustrations.

(*d*) The effect of CO_2 on the solvent power of water, and processes in nature that are dependent on such effect.

(*e*) The hardness of water, — its cause and its remedy.

BOTANY.

1. *Functions of Organs.* — Mention one or two important functions of each of the following organs: the root, the stem, the leaf and the flower. Tell briefly how the functions mentioned are performed.

2. *Description of a Plant, or of some Part thereof.* — Make sketches or diagrams of the specimen furnished you by the examiner, attach their appropriate botanical names to such parts of your drawing as may be conveniently designated, and give a concise, orderly, botanical account of the more conspicuous features of the specimen itself.

Or, take as your theme the *apple* (an immature specimen furnished by the examiner will answer as well as a mature one), sketch it, make diagrams of cross and longitudinal sections, and designate such parts as you show with their botanical names. Write about your specimen under the following heads: —

(*a*) The calyx of the apple, — a full botanical account of it.

(*b*) Botanical facts revealed by the sections.

(*c*) Things which the character of the fruit leads you to assume as true of the flowers, the leaves, and the branches of the tree.

(*d*) Compare grafting with the planting of seeds as a means of raising a particular variety of apple, as the Baldwin, the pippin or the russet.

3. *Fruit.*

(*a*) The part of the flower from which the fruit is developed.

(*b*) Modifications and uses of different parts of the fruit in at least four of the following cases: (1) the dandelion, (2) the chestnut), (3) the apple and the pear, (4) the cucumber, the squash and the melon, (5) the cherry and the peach, (6) the maple, and (7) the bean and the pea.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 22 AND 23, 1899.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour.

DRAWING.

Take either 1 or 2.

1. Make a sketch from memory or imagination of a simple vase or bowl of good proportions and outline, centrally placed, below the eye, on a rectangular block.

2. Make the plan and elevation of a monument. Its base is a plinth 4′ square and 1′ 6″ high, on which stands symmetrically a prism 3′ square and 9′ high The lines of the prism are continued by those of a square pyramid 3′ high. Let the scale be ½″ = 1′. Add the dimensions properly and state the scale on the drawing.

Take either 3 or 4.

3. Sketch from nature some twig or branch with leaves or flowers, or both. Conventionalize the leaves or flowers, or both, and use them in a centre design.

4. Draw two or three units of historic ornament and name them. Show, by illustration as well as by description, how a border may be composed from one or more of them.

Take either 5 or 6.

5. Make several rapid sketches, from available objects about you (books, desks, vases, fruits, flowers, window views, etc.), to show your proficiency in drawing.

6. Write about color under the following heads: —

(*a*) The six leading normal colors, with the twelve intermediate hues, in order.

(*b*) Hues, tints, shades, tones and scales of color, — definitions and illustrations.

(*c*) Harmony of colors, with illustrations from the flowers and the foliage of the buttercup, the white lilac and the red rose.

Music.

1. Do you read music or sing, or play a musical instrument? Give an account of such training as you have received or of such work as you have done in any or in all of the foregoing studies. If you have given special attention to such allied themes as musical composition, the history of music or the lives of people eminent in music, mention the fact.

Take either 2 or 3.

2. Rule neatly a staff of four measures or bars; place properly upon it the G clef, the signature of two sharps and the direction that each measure shall contain four quarter notes or their equivalent; and then fill out the measures correctly, so far as time values are concerned, with notes of various lengths, introducing one or two rests, to illustrate their use. While a melodious result is desirable, it is not essential for the purposes of this exercise.

3. If this number is chosen, the candidate will answer such oral questions as the examiner may ask about simple written music, sing or play something at pleasure, or otherwise respond to the examiner's tests of knowledge or power, as conditions suggest.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 12 AND 13, 1899.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Dryden's *Palamon and Arcite;* Pope's *Iliad,* Books I., VI., XXII. and XXIV.; *The Sir Roger de Coverley Papers* in *The Spectator;* Goldsmith's *Vicar of Wakefield;* Coleridge's *Ancient Mariner;* De Quincey's *The Flight of a Tartar Tribe;* Cooper's *The Last of the Mohicans;* Lowell's *Vision of Sir Launfal;* Hawthorne's *The House of the Seven Gables.*

Add to the list other books of literary merit which you have read.

2. Write briefly on *any two subjects* selected from the list that follows. The point here is not the extent of your knowledge about the selected subjects so much as your ability to say a few things about them in a simple, clear, orderly and correct way.

(*a*) The story of Palamon and Arcite.

(*b*) Some of the problems that confront one who would translate Homer's *Iliad* into English.

(*c*) *The Sir Roger de Coverley Papers,* — what they are about and why they are esteemed in literature.

(*d*) *The Vicar of Wakefield,* — "simple in affluence and majestic in adversity."

(*e*) *The Last of the Mohicans,* — such an account of the book as might be written in response to one who inquires what it is about and whether it is worth reading or not.

The candidate may substitute for *The Last of the Mohicans* any book he has read in his school literature course outside of the books prescribed for the admission examinations to the normal schools.

(*f*)

(*f*) Tell enough of the story in *The Vision of Sir Launfal* to illumine either of the following passages: —

(1) The leper raised not the gold from the dust:
"Better to me the poor man's crust,
Better the blessing of the poor,
Though I turn me empty from his door."

(2) "Who gives himself with his alms feeds three, —
Himself, his hungering neighbor and me."

(*g*) Either of the following: —

(1) Hepzibah Pyncheon.

(2) Nathaniel Hawthorne.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other work written in connection with the reading of books from the prescribed list, and properly certified by the teacher, let the fact be mentioned under this number.

Study and Practice.

3. Tell what books of the following list you have critically studied: Shakespeare's *Macbeth*; Milton's *Paradise Lost*, Books I. and II.; Burke's *Speech on Conciliation with America*; Carlyle's *Essay on Burns*.

Add to the list other books of literary merit which you have critically studied.

4. Take *one only* of the subjects (*a*), (*b*) and (*c*) that follow, limiting yourself to the points suggested: —

(*a*) Either of the following: —

(1) The dominant passion unfolded in the tragedy of *Macbeth*, what the weird sisters had to do with it, contrasts between Lord and Lady Macbeth in their exhibition of it, steps taken by them to gratify it, one or two illustrations of the twinges of conscience that came to them because of such gratification, and the *dénouement* or outcome of it all.

(2) Comments on the italicized passages: —

"*Our fears in Banquo*
Stick deep; and in his royalty of nature
Reigns that which *would be fear'd*; 'tis much he dares;
And, to that dauntless temper of his mind,
He hath a wisdom that doth guide his valour
To act in safety. There is none but he
Whose being I do fear; and, under him,
My *genius is rebuk'd*; as, it is said,
Mark Antony's was by Cæsar. He chid the sisters
When first they *put the name of king upon me*,
And bade them speak to him: then prophet-like

(*f*)

They hail'd him father to a line of kings:
Upon my head they plac'd *a fruitless crown*,
And put a barren sceptre in my gripe,
Thence to be wrench'd *with an unlineal hand*,
No son of mine succeeding. If't be so,
For Banquo's issue have I *fil'd my mind*;
For them the gracious Duncan have I murder'd;
Put rancours in the vessel of my peace
Only for them; and *mine eternal jewel*
Given to the *common enemy of man*,
To make them kings."

(*b*) Either of the following: —

(1) Qualities of Burke's speech on *Conciliation with America* that make it worthy of study in the schools.

(2) The conditions under which Burke gave the speech, his aim in giving it, and an outline of the method he adopted to attain his end.

(*c*) Write upon either of the following: —

(1) *Paradise Lost*, — something about the author of it, the times in which he lived, the sort of themes that interested him most and the circumstances under which he wrote the poem; also, why is is called an epic and given so high a place in the world of letters.

(2) He, above the rest
In shape and gesture proudly eminent,
Stood like a tower; his form had yet not lost
All its original brightness; nor appear'd
Less than archangel ruin'd and the excess
Of glory obscur'd: as when the sun, new risen,
Looks through the horizontal misty air,
Shorn of his beams; or from behind the moon,
In dim eclipse, disastrous twilight sheds
On half the nations, and with fear of change
Perplexes monarchs.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read? Have you studied French or German? If so, to what extent?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Translate into idiomatic English:* —

Hac victoria sublatus Ambiorix statim cum equitatu in Aduatucos, qui erant ejus regno finitimi, proficiscitur; neque noctem neque diem intermittit pedidatumque se subsequi jubet. Re demonstrata Aduatucisque concitatis, postero die in Nervios pervenit, hortaturque ne sui in perpetuum liberandi

atque ulciscendi Romanos pro eis quas acceperint iniuriis, occasionem dimittant; interfectos esse legatos duos magnamque partem exercitus interisse demonstrat; nihil esse negotii subito oppressam legionem quae cum Cicerone hiemet interfici; se ad eam rem profitetur adiutorem. Facile hac oratione Nerviis persuadet. — *Cæsar V., 38.*

Translate into Latin:—

He urged the Nervii to take vengeance on the Romans for what they had done and to free themselves forever. The Aduatici, he said, would aid them in the enterprise.

(*b*) *Translate into idiomatic English:—*

Vix ea fatus erat, summo cum monte videmus
ipsum inter pecudes vasta se mole moventem
pastorem Polyphemum et litera nota petentem,
monstrum horrendum, informe, ingens, cui lumen ademptum.
Trunca manu pinus regit et vestigia firmat;
lanigerae comitantur oves — ea sola voluptas
solamenque mali.
Postquam altos tetigit fluctus et ad aequora venit,
luminis effossi fluidum lavit inde cruorem
dentibus infrendens gemitu, graditurque per aequor
iam medium, necdum fluctus latera ardua tinxit.
Nos procul inde fugam trepidi celerare, recepto
supplice sic merito, tacitique incidere funem;
verrimus et proni certantibus aequora remis.

— *Æneid III., 655-668.*

Exercises:—

Scan the fourth line.
Tell the story of Polyphemus, of which the foregoing is a part.

French.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *Translate into idiomatic English:—*

La foule en ce moment était si grande, que chacun le coudoyait en marchant. Camille avait beau lever ses yeux humides de larmes sur tout ce monde qui l'entourait et le heurtait, aucun regard bienveillant ne se tournait vers lui Le pauvre enfant en devint froid des pieds à la tête; il sentit se glacer sur son front les gouttes de sueur que la chaleur y avait fait naître. Bientôt fatigué de regarder les promeneurs, il s'arrêta devant un groupe d'enfants. Les uns accompagnés de leurs bonnes, les autres de leurs parents; il n'y avait que Camille qui fut seul dans cet immense et beau jardin; a chaque pas qu'il faisait, son cœur se serrait. Pourtant il ne pleurait plus, il ne l'osait, le pauvre enfant; il ne tarda pas a ressentir de

nouveau les angoisses de la faim; alors, dans un mouvement de depit et de colère, il lui échappa de dire: "Oh, Dieu le punira, mon cousin."

—*Mme. E. Foa.*

3. *Translate into French:—*

The boy walks through the crowd to a garden, where he finds a group of little children. The boy's name is Camille. He is hungry and cold.

GERMAN.

1. Tell what you have done in the study of German,—the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:—*

Der Löwe mit anderen Tieren auf der Jagd.

Der Löwe, ein Schaf und andere Tiere gingen zusammen auf die Jagd. Der Löwe schwur, er wolle nach ihrer Zurückkunft alles Erbeutete mit ihnen teilen.

Als nun der Hirsch in einem Sumpfe stecken blieb, wo gerade das Schaf Wache hielt, meldete dieses dem Löwen den Vorfall. Der Löwe eilte herbei, erwürgte den Hirsch und teilte die Beute in vier gleiche Teile.

„Der erste Teil gehört mir," sagte er nun zu den Umstehenden, „weil ich der Löwe bin; — der zweite, weil ich der herzhafteste unter euch bin; — den dritten müßt ihr mir als dem stärksten überlassen, und den werde ich auf der Stelle erwürgen, welcher mir den vierten abspricht." So behielt der Löwe den ganzen Hirsch, ohne daß es seine Jagdgenossen auch nur wagen durften, darüber zu klagen.

3. *Translate into German:—*

I am the lion; so you must give me the first part. The second part belongs to me for my courage and the third for my strength. The fourth part nobody dares to refuse me.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 12 AND 13, 1899.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. A yard is approximately .9 of a meter. What fraction of an inch is a centimeter?

2. How many times does the least common multiple of 77, 231, 462 and 2,772 contain the greatest common divisor of the same numbers?

Take either 3 or 4.

3. If 8 men can reap 40 acres of wheat in 7 days, working 5 hours a day, how many acres can 24 men reap in 28 days, working 10 hours a day? Do the work by analysis, giving the reasoning in full, but as concisely as possible.

4. The diameter of a bicycle wheel is $2\frac{1}{4}$ feet. How many turns does it make in going a mile (ratio of the circumference to the diameter, $3\frac{1}{7}$)? The same number of turns would take the wheel how far if its diameter were increased an inch?

ALGEBRA.

Take either 1 or 2.

1. Find by inspection the least common multiple of a^2-1, a^2+2a-3 and a^3-7a^2+6a.

2. Simplify $\frac{1}{x-1}-\frac{2}{x}+\frac{1}{x+1}$.

Take either 3 or 4.

3. What is the value of x in the following equation: —

$$\frac{27-x}{7}+\frac{3x-4}{5}-\frac{5x-2}{9}=2?$$

4. A and B have the same annual income. A saves $\frac{1}{8}$ of his income each year, and B spends $50 each year more than A. At the end of four years B finds himself $100 in debt. Find their annual income.

Take either 5 or 6.

5. Give the formula or equation for the amount a when a sum of money p is put at simple interest for t years at a rate per cent. represented by r.

From this formula for a obtain the value of p. Translate the formula for p thus obtained into a rule.

With the aid of this formula for p, find what principal will yield an amount of $570 in 4 years at 5 per cent.

6. Solve the equations $\frac{1}{x}-\frac{1}{y}=1$ and $2xy+9=0$.

GEOMETRY.

Take either 1 or 2.

1. Prove that the bisectors of the adjacent angles of a parallelogram are perpendicular to each other.

2. $ABCD$ is a parallelogram; E and F are middle points in the parallel sides AD and BC respectively. Show that BE and DF, cutting the diagonal AC at the points G and H respectively, will trisect it.

Take either 3 or 4.

3. Prove that the non-parallel sides of an inscribed trapezoid are equal.

4. Prove that the angle formed by a tangent and a chord is measured by one half of the intercepted arc.

Take either 5 or 6.

5. Find the mean proportional of 4 and 9 —

(*a*) By the algebraic method.

(*b*) By the geometric method.

6. The side of a square is m. Express in terms of m

(*a*) The area of a circle inscribed in the square.

(*b*) The area of a circle circumscribed about the square.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 12 AND 13, 1899.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one number only.

2. *The Critical Period between 1783 and 1789.*

(*a*) Two or three sources of weakness in the government of the United States during this period.

(*b*) Two or three causes of State jealousies and antagonisms during this period.

(*c*) The money of this period.

(*d*) The movement for a better government and some of its leaders.

(*e*) The outcome of the movement and the wisdom of that outcome.

3. *Slavery.*

(*a*) Slavery before the Revolution, — its prevalence, the attitude of the people towards it, and how it came to die out in the North while surviving in the South.

(*b*) Circumstances after the Revolution that increased the demand for slave labor in the South.

(*c*) Why the South had occasion to fear for the welfare and existence of the institution.

(*d*) The balance of power between the free States and the slave, — what it was, why it was deemed important, and one or two illustrations of compromises made to preserve it.

(*e*) The final destruction of this balance of power.

4. *Andrew Jackson.*

(*a*) How Jackson came to be president.

(*h*)

(*b*) The spoils system, — what it is, Jackson's relation to it, its evils and recent efforts to overcome them.

(*c*) Nullification, — the significance of the doctrine, circumstances that led to its advocacy by one of the States, a memorable discussion of it in the United States Senate, Jackson's attitude towards it and the service rendered by him to the country in taking that attitude.

(*d*) Two or three prominent traits in Jackson's character.

5. *The Great Lakes.*

(*a*) A sketch or diagram to show the relative positions of the Great Lakes and the locations of at least five important cities on or near their borders (the accuracy of a map is not called for).

(*b*) Their communication with the sea, certain limitations that impair it and measures adopted to overcome them.

(*c*) Their commercial importance.

(*d*) One or two historical events associated with them.

(*e*) The ownership of the Great Lakes and the policy adopted with reference to war vessels thereon.

6. *The Philippine Islands.*

(*a*) Their location, magnitude, people, industries, etc.

(*b*) The nature of the title on which the United States bases its claim to govern the islands.

(*c*) The nature of the title on which the Philippine insurgents base their claim to govern the islands.

(*d*) The Monroe doctrine, — what it is and why it figures in the discussions that concern our attitude towards the Philippines.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 12 AND 13, 1899.

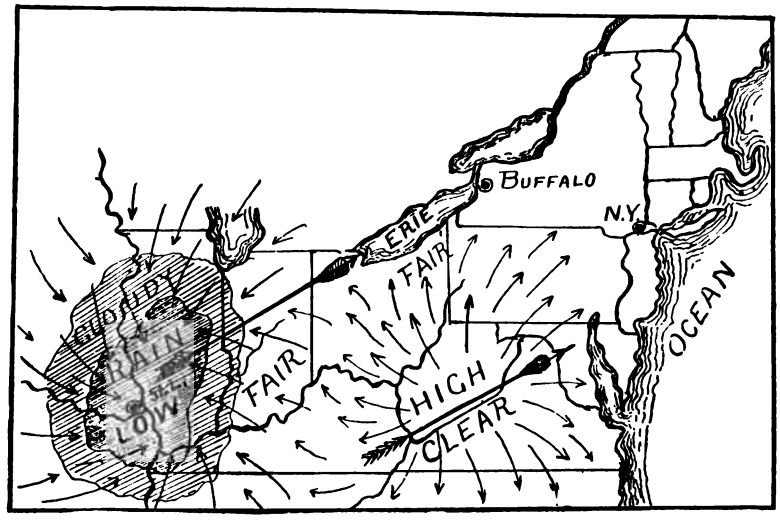
IV. — SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent. Under each science *take one number or topic only*, with its subdivisions. Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

1. *Study of a Weather Map.*

(*a*) The significance of the words "high" and "low" as applied to the regions so marked on the accompanying weather map.



(*b*) The directions of the winds about the high area as compared with their directions about the low, and the causes that determine these directions.

(*c*) Why clouds and rain are more likely to be present in the low area than in the high.

(*d*) A weather map based on observations a day later than those of the map here given indicates that the low area is central over Lake Erie, the high area having moved parallel with it. The weather bureau, anticipating on the first day the conditions revealed by the map on the second, was able to make what weather predictions for the second day at Buffalo?

(*e*) What predictions was it able to make for the second day at St. Louis?

2. *Changes which Lands undergo.*

(*a*) The weathering of the lands.

(*b*) The wearing away of the lands.

(*c*) The formation of soil.

(*d*) Other land changes than the foregoing.

(*e*) Two or three illustrations to show the relation of some of these changes to life and history, whether plant, animal or human.

3. *Rivers.*

(*a*) Their erosive action.

(*b*) Their flood plains.

(*c*) Their meandering.

(*d*) Their deltas.

(*e*) Their relations to forests.

Physiology.

1. *The Bones.*

(*a*) The various kinds of service rendered by them, with illustrations.

(*b*) Joints, — their general structure, with some account of those at the knee, the hip and the neck, respectively.

(*c*) The bones of childhood and the special dangers to which they are exposed.

(*d*) The bones of old age and the special dangers to which they are exposed.

(*e*) The sprain, the dislocation and the fracture, — what they are.

2. *Why we need Food.*

(*a*) Energy in the body, — various ways in which it is exhibited.

(*b*) Animal heat, — its source, constancy, distribution, regulation, etc.

(*c*) Waste material of the body, — its origin, the ways in which it is eliminated from the system, and what the consequences are when the loss is not made good.

(*d*) The four classes into which foods may be conveniently divided.

(*e*) The service rendered by each class to the needs of the body.

3. *Respiration.*

(*a*) Some account of the lungs.

(*b*) The mechanism of breathing.

(*c*) Effects of respiration on the blood.

(*d*) Experiments to show that the air of expiration is warm, moist and charged with carbon dioxide

(*e*) How the respiratory apparatus is affected by the alcohol habit.

PHYSICS.

1. *Laboratory Exercise.*

If a satisfactory notebook of experiments performed by the candidate is submitted, the examiner may, at his discretion, assign the candidate an exercise or a choice of exercises to be taken in the laboratory or he may question the candidate upon any portion of the proffered notebook.

2. *Levers.*

(*a*) Make diagrams to illustrate a lever of the first class, a lever of the second and a lever of the third, the power, the fulcrum, the weight, the power arm and the weight arm for each class to be designated by P, F, W, AF and BF respectively.

(*b*) To what class does each of the following belong: a pump handle, the oar of a boat, a pair of scissors, a pair of nut crackers, a pair of sugar tongs?

(*c*) The law of the lever.

(*d*) In a lever 5 feet long where must the fulcrum be for a power of 5 pounds at one end to balance a weight of 20 pounds at the other?

(*e*) When a power of 5 pounds in a lever of the first class lifts a weight of 20 pounds, what loss must be set over against the gain?

3. *Energy.*

(*a*) What it is, and how kinetic energy differs from potential. Illustrate with a watch.

(*b*) The conversion of mechanical energy into heat and the converse, with illustrations.

(*c*) The mechanical theory of heat.

(*d*) Trace the transformations of energy from that stored up in the coal at the power station to that expended on an electric car in service.

(*e*) The foot-pound, — what it is and the use that is made of it.

4. *Sound.*

(*a*) What it is as a cause and what it is as an effect.

(*b*) Velocity of sound, — what it is in air, how it is determined, and whether it varies or not for high sounds and low.

(*c*) The pitch of a musical sound is due to what? Illustrate with cardboard and a toothed wheel?

(*d*) How the length, diameter and tension of a string as well as the density of its material respectively affect the number of vibrations per second it is capable of making.

(*e*) The quality of a musical sound is due to what?

CHEMISTRY.

1. *Laboratory Exercise.*

If a satisfactory notebook of experiments performed by the candidate is submitted, the examiner may, at his discretion, assign the candidate an exercise or a choice of exercises to be taken in the laboratory or he may question the candidate upon any portion of the proffered notebook.

2. *Water.*

(*a*) The facts and reasoning upon which the symbol H_2O is based.

(*b*) The stability of water, — what is meant by it, what the cause of it is, and what the value of it is to the world.

(*c*) The solvent power of water, with illustrations.

(*d*) The effect of CO_2 on the solvent power of water, and processes in nature that are dependent on such effect.

(*e*) The hardness of water, — its cause and its remedy.

3. *Ammonia.*

Ammonia may be made in the laboratory by mixing certain substances in a flask and gently heating them, the reaction that occurs being represented as follows: —

$$2\,NH_4Cl + CaO_2H_2 = 2\,NH_3 + CaCl_2 + 2\,H_2O.$$

(*a*) The names, scientific and popular, for the five compounds of the foregoing equation, the quantities of matter respectively represented by their symbols, the numbers of atoms of N, H, Cl, Ca and O respectively in each member, and the combining weights for the five terms in order (N, 14; Cl, 35.5; Ca, 40).

(*b*) The number of grams of H_3N that can be made from 214 grams of NH_4Cl.

(*c*) The part played by the heat in the reaction.

(*d*) The properties of ammonia.

(*e*) The use of ammonia in the artificial manufacture of ice.

4. *The Microscopic Organisms known as Bacteria.*

(*a*) Their prevalence and the service they render in nature.

(*b*) The relation they hold to fermentation, to decay and to disease.

(*c*) Various ways in which foods may be preserved against their ravages.

(*d*) Hygienic precautions to reduce the danger of exposure to them (in wounds, surgical operations, contagion, etc.).

(*e*) Why this topic might have been assigned a place under the head either of physiology or of botany.

BOTANY.

1. *Description of a Plant.*

Describe, under the following heads, the plant furnished you by the examiner: —

(*a*) The stem and the leaves.

(*b*) The floral envelopes.

(*c*) The essential organs.

(*d*) The ovary, and, if the specimen permits it, the fruit.

(*e*) Other characteristics.

2. *The Classification of Plants.*

(*a*) Natural groups, — evidences you have noted that plants fall into such groups.

(*b*) The usual distinction made between a species and a genus, with illustrations.

(*c*) Varieties, — what they are, with illustrations, and how it happens that some plants are assigned by one botanist to the same species as varieties of it and by another to different species.

(*d*) Larger groups than the genus, with illustrations.

(*e*) What great thought because of these natural groups has come to botanists about unity in the plant world?

3. *Cross-fertilization.*

Write about the cross-fertilization of flowers and explain provisions for it either by means of the *wind*, as shown

(*a*) In the condition of the pollen.

(*b*) In the position of the staminate flowers.

(*c*) In the appearance of flowers before the leaves.

(*d*) In the lack of odor, color and nectar.

(*e*) And in other ways.

Or by means of *insects*, as shown

(*a*) In insect structure and habits.

(*b*) In the odors, bright colors and nectaries of flowers.

(*c*) In the irregularities of corolla shapes.

(*d*) In the protection which certain flowers have against the entrance of unwelcome visitors.

(*e*) And in other ways.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 12 AND 13, 1899.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour, — an average of ten minutes for each number or exercise required.

DRAWING.

1. Tell briefly what you have done in drawing, — what branches of the subject you have studied, how much time you have given to them separately or in the aggregate, etc.

Take either 2 or 3.

2. A watering trough is made from a granite block that is 5 feet long, 2 feet wide and 18 inches thick, the sides and bottom being 4 inches thick. Make three views or working drawings of this block, using a scale of one-half inch to the foot. Indicate the scale, name the views and put in the dimensions properly.

3. Draw three views of a geometric solid having the length, width and thickness of some book within reach. Scale, one-half inch to the inch. Mark the dimensions properly. Draw lines in the different views to show how the solid might be cut into three equal and similar pieces.

Take either 4 or 5.

4. Make an outline sketch of a group of two or more objects. A group may be set before you by the examiner, or you may arrange a group of your own from available material about you (a cube, a cylinder, a cone, a block of any kind, a book, a tumbler, a vase, a bottle, an ink eraser, a crayon, a flower pot, a desk, a chair, a corner of the room, etc.).

5. Sketch from nature some twig or branch with leaves or with leaves and flowers Conventionalize such parts of the specimen as you choose, and use these parts in some design for a surface pattern suitable for a calico print.

Take either 6 or 7.

6. Draw from memory one of the following conventional ornamental units, naming the unit you select: the Egyptian lotus, the Greek anthemion, the Gothic fleur-de-lis. Write what you know about the unit selected.

7. What is meant by the complement of a color? Name six colors and their complementary hues. Give at least two illustrations of complementary colors in natural objects.

MUSIC.

1. Do you sing, read music or play a musical instrument? Give an account of such training as you have received or of such work as you have done in music. If you have given special attention to such themes as musical composition, the history of music or the lives of people eminent in music, mention the fact.

Take either 2 or 3.

2. Rule neatly a staff of four measures or bars; place properly upon it the G clef, the signature of two flats and the direction that each measure shall contain four quarter notes or their equivalent; and then fill out the measures correctly, so far as time values are concerned, with notes of various lengths, introducing one or two rests, to illustrate their use. While a melodious result is desirable, it is not essential for the purposes of this exercise.

3. The candidate will answer such oral questions as the examiner may ask about simple written music, sing or play something at pleasure, or otherwise respond to the examiner's tests of knowledge or power, as conditions suggest.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 28 AND 29, 1900.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

1. Write a letter, properly dated, addressed, paragraphed and signed, to the principal of the normal school about your preparatory work in English. Tell in particular what books of the prescribed list you have taken for reading and practice and what for study and practice. As for the rest, deal with any phase of the theme that occurs to you. Hints: other books of literary merit read by you, favorite books, books not liked, exercises in English that have helped you, deficiencies in your English to which your teachers gave special attention, whether your teachers in other subjects than English aimed to hold you up to good work in English, important things in one's successful study of English literature that cannot be reached in an ordinary written examination, etc., etc.

Reading and Practice.

2. Write as freely as the conditions will permit upon any one subject selected from the following list.

If the candidate, instead of writing as directed, offers an exercise book containing compositions or other work written in connection with the reading of books from the prescribed list, and properly certified by the teacher as fair evidence of his work, let the examiner's attention be called to the fact.

(*a*) *Palamon and Arcite*, — any one of the following themes: —

(1) An outline of the story.

(2) The sources of the story.

(3) The verse and the style in which the story is told.

(4) How the author came to tell anew a story that had already been well told in literature.

(*b*) "Achilles' wrath, to Greece the direful spring
Of woes unnumbered, heavenly Goddess, sing!"

(*c*) *The Sir Roger de Coverley Papers*, — a brief account of these *Papers*, such as you might give to one who wants to know what they are, what themes they deal with, why people profess to esteem them, and whether you really like them and would advise one to read them.

The candidate may substitute for *The Sir Roger de Coverley Papers* any book he has read in his school literature course outside of the books prescribed for admission to the normal school.

(*d*) *Ivanhoe*, — any theme the story suggests, as, for example, a free and full account of your favorite character in the tale, or a description of any characteristic phase of Saxon or of Norman life as portrayed therein, or a sketch of the author's life.

(*e*) *The Last of the Mohicans*, — the times, places and events that form the historic background of the story, or Indian traits as depicted by Cooper, or a description of David Gamut, or any other theme the story suggests.

(*f*) *The Vision of Sir Launfal*, — any one of the following themes: —

(1) The purpose and plan of the poem.

(2) The story of the Holy Grail.

(3) The spirit of the first prelude as compared with that of the second, and the relation of each prelude to the part it introduces.

(4) "Who gives himself with his alms feeds three, —
Himself, his hungering neighbor, and me."

Study and Practice.

3. Take one only of the subjects (*a*), (*b*), (*c*) and (*d*) that follow, limiting your writing to the points suggested: —

(*a*) *Paradise Lost*, — four of the following points: —

(1) The story in outline of Book I.

(2) The story in outline of Book II.

(3) Two or three of the sources from which the poet drew his material, with an illustration of material drawn from each one of them.

(4) Qualities ascribed by the poet to Satan that make him preëminent among the fallen angels.

(5) A quotation to illustrate the strength or the melody or the correspondence of sound and sense or any other quality in Milton's style, with comments on the quotation.

(6) What you find in the poem to like or dislike.

(*b*) *Macbeth*, — either (1) or (2): —

(1) The rise, progress and sequel of Macbeth's ambition, as portrayed in the drama. Hints: Did this ambition originate in Macbeth's own mind or in the suggestions of the weird sisters? What was Lady Macbeth's relation to it? With what difference of spirit did Lord and Lady Macbeth work themselves up to the great crime committed? What different effects

did the crime produce upon them? How did it turn out in each case that ambition overreached itself?

(2) Comment upon the italicized expressions and upon the passage as a whole: —

"Time, thou *anticipatest* my *dread* exploits:
The *flighty purpose* never is *o'ertook*
Unless the deed go with it: from this moment
The very *firstlings of my heart* shall be
The *firstlings of my hand.* And even now,
To crown my thoughts with acts, *be't thought and done:*
The Castle of Macduff I will surprise;
Seize upon Fife; give to the edge o' the sword
His wife, his babes, and all the unfortunate souls
That *trace him in his line.* No boasting like a fool;
This deed I'll do before this purpose cool:
But no more sights!"

(*c*) What lessons or principles of service in argumentative composition have you gathered from your study of Burke's speech on *Conciliation with America?*

(*d*) Write upon one of the following themes suggested by Macaulay's *Essay on Milton:* —

(1) Macaulay's conception of poetry, of the state of society in which it best flourishes, of the causes that tend to curb the poetic spirit and of Milton's triumph over them

(2) Some differences pointed out by Macaulay between *Paradise Lost* and the *Divine Comedy*, particularly in the characterization of supernatural agents.

(3) Macaulay's description of the Puritans.

(4) Traits of Macaulay as a writer, as exhibited in this essay.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Alexander captures the city of Celænæ.*

Translate into idiomatic English: —

Inter haec Alexander ad conducendum ex Peloponneso militem Cleandro cum pecunia misso Lyciae Pamphyliaeque rebus conpositis ad urbem Celaenas exercitum admovit. Media illa tempestate moenia interfluebat Marsyas amnis, fabulosis Graecorum carminibus inclitus. Fons eius ex summo montis cacumine excurrens in subiectam petram magno strepitu aquarum cadit: inde diffusus circumiectos rigat campos, liquidus et suas dumtaxat undas trahens. Itaque color eius placido mari similis locum poetarum mendacio fecit: quippe traditum est nymphas amore amnis

retentas in illa rupe considere. Ceterum quamdiu intra muros fluit, nomen suum retinet: at cum extra munimenta se evolvit, maiore vi ac mole agentem undas Lycum appellant. Alexander quidem urbem destitutam ab suis intrat, arcem vero, in quam confugerant, oppugnare adortus caduceatorem praemisit, qui denuntiaret, ni dederent, ipsos ultima esse passuros. Illi caduceatorem in turrem et situ et opere multum editam perductum, quanta esset altitudo, intueri iubent ac nuntiare Alexandro, non eadem ipsum et incolas aestimatione munimenta metiri: se scire inexpugnabiles esse, ad ultimum pro fide morituros. Ceterum ut circumsideri arcem et omnia sibi in dies artiora esse viderunt, sexaginta dierum inducias pacti, ut, nisi intra eos auxilium Dareus ipsis misisset, dederent urbem, postquam nihil inde praesidii mittebatur, ad praestitutam diem permisere se regi.

Q. Curti Rufi Historiae Alexandri Magni Macedonis, III., 1.

Translate into Latin: —

The herald notes how high the citadel is, and tells Alexander that it cannot be taken by assault. He says that Alexander and the inhabitants do not measure this defence in the same way. But all their circumstances becoming daily more straitened, the inhabitants permit a truce to be agreed upon and at length surrender.

(*b*) *Aeneas at the temple of Juno.*

Translate into idiomatic English: —

Lucus in urbe fuit media, laetissimus umbra,
quo primum iactati undis et turbine Poeni
effodere loco signum, quod regia Iuno
monstrarat, caput acris equi; sic nam fore bello
egregiam et facilem victu per saecula gentem.
Hic templum Iunoni ingens Sidonia Dido
condebat, donis opulentum et numine divae,
aerea cui gradibus surgebant limina, nexaeque
aere trabes, foribus cardo stridebat aënis.
Hoc primum in luco nova res oblata timorem
leniit, hic primum Aeneas sperare salutem
ausus, et adflictis melius confidere rebus.
Namque sub ingenti lustrat dum singula templo,
reginam opperiens, dum, quae fortuna sit urbi,
artificumque manus inter se operumque laborem
miratur, videt Iliacas ex ordine pugnas,
bellaque iam fama totum volgata per orbem,
Atridas, Priamumque, et saevum ambobus Achillem.
Constitit, et lacrimans, 'Quis iam locus' inquit 'Achate,
quae regio in terris nostri non plena laboris?
En Priamus! Sunt hic etiam sua praemia laudi;
sunt lacrimae rerum et mentem mortalia tangunt.
Solve metus; feret haec aliquam tibi fama salutem.'
Sic ait, atque animum pictura pascit inani,
multa gemens, largoque umectat flumine voltum.

Aeneid I., 441–465.

French.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *Translate into idiomatic English:* —

Glorieux mélange d'habileté et de foi, d'ambition et de dévouement, Washington n'avait point d'ambition; sa patrie eut besoin de lui; il devint grand pour la servir, par devoir plutôt que par goût, et quelquefois même avec un pénible effort. Les épreuves de la vie publique lui étaient amères; il préférait l'indépendance de la vie privée et le repos de l'âme à l'exercice du pouvoir. Mais il accepta sans hésiter la tâche que lui imposait son pays; et, en l'accomplissant, il ne se permit, envers son pays ni envers lui-même, aucune complaisance, pour en alléger le fardeau. Né pour gouverner, quoiqu'il y prit peu de plaisir, il disait au peuple américain ce qu'il croyait vrai, et maintenait, en le gouvernant, ce qu'il croyait sage avec une fermeté aussi inébranlable que simple, et un sacrifice de la popularité d'autant plus méritoire qu'il n'en était point dédommagé par les joies de la domination. Serviteur d'une république naissante, où l'esprit démocratique prévalait, il obtint sa confiance et assura son triomphe en soutenant ses intérêts contre ses penchants, et en pratiquant cette politique à la fois modeste et sévère, réservée et indépendante, qui ne semble appartenir qu'au chef d'un sénat aristocratique placé à la tête d'un État ancien. Succès rare, et qui fait un égal honneur à Washington et à son pays. — *Guizot.*

3. *Translate into French:* —

How grand a man was Washington! He preferred private life to public, but when the duty of governing was placed upon him by his country, the task was accepted although it gave him little joy.

German.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:* —

Schwalbenliebe.

Als Otto von Kotzebue bei Kamtschatka vor Anker lag, baute ein Schwalbenpaar ruhig sein Nest nahe bei seiner Kajüte. Ungestört von dem Lärm der Arbeiten auf dem Schiffe brütete das liebende Paar seine Jungen glücklich aus, fütterte sie mit der zärtlichsten Sorgfalt und zwitscherte ihnen fröhliche Lieder vor. Da entfernte sich plötzlich ihre friedliche Hütte vom Lande. Sie schienen darüber in Erstaunen zu geraten und umkreisten ängstlich das immer weiter eilende Schiff, holten aber doch noch vom Lande Nahrung für die Jungen, bis die Entfernung zu groß wurde. Da ging der Kampf zwischen Selbsterhaltung und Elternliebe an. Lange noch umflogen sie das Schiff, verschwanden dann auf einige Zeit, kehrten plötzlich wieder, setzten sich zu ihren hungrigen Jungen, die ihnen die offenen Schnäbel entgegen-

streckten, und schienen sich zu beklagen, daß sie keine Nahrung für sie finden konnten. Dieses Verschwinden und Wiedererscheinen dauerte noch einige Zeit. Endlich blieben sie aus, und nun nahmen sich die Matrosen der Verwaisten an.

3. Compare, with illustrations, the German order of words with the English.

4. Decline **das liebende Paar.**

5. Give the principal parts of **werden, angehen, verschwinden** and **annehmen.**

Translate into German:—

6. The swallows anxiously fly about the ship as it sails away with their nest and their complaining young.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 28 AND 29, 1900.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. (*a*) Divide thirty-two and forty-nine thousand five hundred eighty-nine hundred thousandths by eight thousand seven hundred fifty-nine ten thousandths.

(*b*) If the dividend in (*a*) were a whole number, what would the quotient be?

(*c*) If the divisor in (*a*) were a whole number, what would the quotient be?

Answer (*b*) and (*c*) without going through with the division process a second time.

2. When a train moves at the rate of a mile in two minutes, how many kilometres will it go in one hour? (1 metre = 39.37 inches; 1 kilometre = 1000 metres.)

Take either 3 or 4.

3. The owner of $\frac{3}{14}$ of a mine sells $\frac{7}{9}$ of his share of the mine for $40,500. At the same rate, what ought the owner of $\frac{2}{5}$ of the same mine to receive for $\frac{5}{8}$ of his share? Give the reasoning.

4. The diameter of a wheel is 3 feet. Increasing this diameter by 7 inches increases the circumference by how much? (Ratio of diameter to circumference = 1 to $3\frac{1}{7}$. Give the reasoning.)

ALGEBRA.

Take either 1 or 2.

1. Define the following, giving an illustration in each case: —

(*a*) The dimensions of a term.

(*b*) A homogeneous polynomial.

(b)

(*c*) The degree of an equation.

(*d*) Simultaneous equations.

2. Find by inspection the greatest common divisor and the least common multiple of $a^4 b - a^2 b^3$, $a^5 b^3 - a b^8$ and $a^6 b^2 - 2 a^4 b^4 + a^2 b^6$.

Take either 3 or 4.

3. Add $\frac{a^2 + a + 3}{a^3 + 1}$ to $\frac{a - 2}{a^2 - a + 1}$ and subtract $\frac{1}{a + 1}$ from their sum.

4. Find the value of x (not of y) in the equations $a x - b y = 4$ and $b x + a y = 5$ by each of the following methods in order: —

(*a*) Elimination by addition or subtraction.

(*b*) Elimination by comparison.

(*c*) Elimination by substitution.

Take either 5 or 6.

5. Find the roots of the following equations: —

(*a*) $19 x^2 - 39 x + 2 = 0$.

(*b*) $2 x + 1 = \sqrt{6 x + 3}$.

6. The area of a certain rectangle is equal to the area of a square whose side is 6 inches less than the length of the rectangle. If the length of the rectangle is diminished by 2 inches and its width is increased by 1 inch, its area remains unchanged. What are the sides of the rectangle?

GEOMETRY.

Take either 1 or 2.

1. Define and illustrate the following: —

(*a*) Supplementary adjacent angles.

(*b*) An obtuse isosceles triangle

(*c*) An acute scalene triangle.

(*d*) A rhombus.

2. With the aid of a diagram show how a perpendicular C D may be drawn from a point C without a straight line to the line itself.

How do you know that the line thus drawn is perpendicular to the given line?

Take either 3 or 4.

3. Let A B C D be any quadrilateral. Join E and F, the middle points of A B and B C respectively, by a straight line; also join G and H, the middle points of C D and D A respectively.

(*a*) Prove that E F and G H are parallel.

(*b*) Prove that E F and G H are equal.

4. Prove that two mutually equiangular triangles are similar.

Take either 5 or 6.

5. What is the locus —

(*a*) Of the middle points of all chords of a given length that can be drawn in a given circle?

(*b*) Of the middle points of all chords that can be drawn through a given point A in a given circumference?

6. What is the area of a circle? Prove it by the method of limits.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 28 AND 29, 1900.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

1. If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one number only.

1. *Settlement of North America.*

(*a*) The different European nationalities that planted colonies.

(*b*) The motives for emigration to America.

(*c*) Names and locations of early settlements made by each nationality.

(*d*) The geographical reasons for the selection of these localities.

(*e*) Some of the leaders in colonization.

2. *The United States from 1800 to 1900.* — Compare the condition of the United States at the opening of the nineteenth century with its condition at the close in respect to the following points: —

(*a*) Territorial possessions.

(*b*) Population, — number, composition, distribution, etc.

(*c*) Industries.

(*d*) Transportation.

(*e*) Any other point.

3. *The Civil War.*

(*a*) Causes that led to it.

(*b*) The blockade of the southern ports, — its object, extent and success.

(*c*) The importance of the Mississippi River to each side, the struggle for its control, and the decisive event in that struggle.

(*d*) Sherman's march to the sea, and what was accomplished by it.

(*e*) Two or three of the names made famous by the civil war, with reasons therefor.

(*f*) Some of the things settled by the war.

4. *Notable Events in United States History.* — Select and expand, in accordance with an analysis or plan of your own, one of the following topics: —

(*a*) The organization of the national government under Washington.

(*b*) The purchase of Louisiana.

(*c*) The Monroe doctrine.

(*d*) Slavery compromises.

(*e*) The wars of the United States.

(*f*) Territorial acquisitions during the present administration

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 28 AND 29, 1900.

IV. — SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent. Under each science *take one number or topic only,* with its subdivisions. Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

1. *The Atmosphere.*

(*a*) Its variations in weight, — how they are caused, and what instrument is used in measuring them.

(*b*) Its movements, and what causes them.

(*c*) Variations in its watery vapor, and what causes them.

(*d*) Some of its regular or uniform movements.

(*e*) Some of its irregular movements.

2. *Soil.* — Let your illustrations come, so far as practicable, from your own observation.

(*a*) The sources from which all kinds of soil come.

(*b*) Different kinds of soil, as loam, clay, etc., with their characteristics.

(*c*) Agencies in forming the different kinds.

(*d*) Movements of soil because of gravity, wind and water.

(*e*) Uses of soil.

3. *Rivers.* — Let your illustrations come, so far as practicable, from your own observation.

(*a*) Terms used in connection with rivers, as bed, channel, flood plain, watershed, delta, bar, etc.

(*b*) Erosion by rivers, — what it is, evidence that rivers transport soil, conditions that affect the quantity of soil carried, names given to material deposited along the banks and at the mouth, effect of lakes in a river course upon the sediment carried, etc.

Physiology and Hygiene.

Write upon any one of the following topics, in accordance with a plan of your own, carefully selecting four or five points for treatment before you begin to write: —

1. *The blood.*

2. *Respiration.*

3. *The brain.*

4. *The sense of sight.*

5. *Effects of alcohol upon the system.*

Physics.

1. *Laboratory Exercise.* — The candidate may submit a notebook of experiments which he has performed, in which case the examiner may, at his discretion, assign to the candidate for laboratory work an exercise or two from the proffered notebook, or question him upon any portion of the notebook.

2. *An Exercise in describing Apparatus.* — With the aid of a diagram describe the construction of any one of the following pieces of apparatus, giving an illustration of its use, and explaining as clearly and fully as possible the principles involved in such use: a common "suction" pump, a barometer, an apparatus for finding the specific gravity of a body heavier than water, an hydraulic press, an electric bell.

3. *Magnets.*

(*a*) The process of making a magnet

(*b*) Differences between temporary magnets and permanent.

(*c*) The law of the poles of a magnet.

(*d*) The common compass and its use.

(*e*) The magnetism of the earth.

4. *Heat.*

(*a*) State definitely, in the order of occurrence, the changes in *volume* and *state of matter* of a mass of water in passing (1) from a temperature of 60° F. to that of 20° F., (2) from 20° F. to 220° F., and (3) from 220° F. to 60° F.

(*b*) In what important respect does the behavior of water in passing from the liquid to the solid state differ from that of most substances?

(*c*) What important practical results follow from the fact that water behaves as it does?

(*d*) What is meant (1) by the latent heat of fusion and (2) by the latent heat of vaporization?

(*e*) At what points in the series of changes referred to under (*a*) above would the phenomena named under (*d*) be involved?

CHEMISTRY.

1. *Laboratory Exercise.*

(*a*) Hold a piece of red-hot charcoal in a bottle for a few moments. Remove the charcoal, pour some lime water into the bottle and shake thoroughly.

(*b*) Write out your observations, and, with the aid of chemical equations, show what changes have taken place.

(*c*) Hold yourself ready to answer the examiner's questions about the facts, changes and principles involved in this exercise.

2. *Chemical Action.*

(*a*) Describe simple experiments to bring out clearly the differences between physical action and chemical action.

(*b*) Different ways of promoting chemical action.

(*c*) What determines the duration of a chemical change?

(*d*) What determines the intensity of chemical action?

(*e*) State any one law of chemical action, explaining and illustrating its significance.

3. $Zn + H_2SO_4 = H_2 + ZnSO_4$.

(*a*) Give a free translation of the equation.

(*b*) The acid in the reaction is diluted. Why?

(*c*) For what different purposes is the reaction available?

(*d*) Mention some principles of chemistry illustrated by the reaction.

(*e*) Suppose 10 grams of hydrogen are wanted in the reaction, how much zinc must be used?

4. *Liquefaction of Gases.*

(*a*) State the two principles upon which the liquefaction of gases depends.

(*b*) Give a general description of the process of manufacturing liquid ammonia.

(*c*) For what is liquid ammonia used?

(*d*) What gases have recently been liquefied? Give the properties of one of these liquefied gases.

BOTANY.

1. *Description of a Plant.* — Select any five points about which you can write intelligently in connection with the plant furnished you by the examiner, and expand each of them. Let your treatment of some one of these points include one or more diagrams or sketches by way of illustration.

2. *Germination of Seeds.*

(*a*) Of what seeds have you watched the development?

(*b*) Conditions requisite for germination.

(*c*) Successive stages in the growth of a dicotyledonous seed, with a diagram to show the parts or details of the developing seed.

(*d*) How a monocotyledonous seed differs from a dicotyledonous one in structure and growth.

(*e*) The food of the germinating seed.

3. *Advantage to the Plant of Certain Details of Structure.* — Show wherein a plant derives advantage from such special structural details as the following: —

(*a*) The flat, thin form of leaves.

(*b*) The fibrous, branching nature of roots.

(*c*) The thick, fleshy structure of the cactus plant.

(*d*) The thick root of the beet.

(*e*) Any other details or peculiarities of form, structure, color, etc., that occur to you.

4. *A Family of Plants.*

(*a*) Name several plants belonging to some order or family with which you are acquainted (as the Crowfoot family or the Rose or the Fern or any other).

(*b*) In what respects do these plants resemble one another?

(*c*) In what respects do they differ from one another?

(*d*) Natural groups within families, — what they are called, the principle or law of the grouping, one or two illustrations of each sort of grouping, etc.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 28 AND 29, 1900.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour.

DRAWING.

Take either 1 or 2.

1. Make a geometric drawing of a simple vase or bowl of good proportions and outline.

2. Make the plan and elevation of a box 2 feet long, 1 foot wide and 6 inches high; stock, 1 inch thick. The box has no cover. Let the scale be $\frac{1}{2}'' = 1'$. Add the dimensions properly and state the scale on the drawing.

Take either 3 or 4.

3. Sketch from nature some twig or branch with leaves or flowers, or both. Conventionalize the leaves or flowers, or both, and use them in a surface design.

4. Describe two famous pictures, and tell what you know about the artists who painted them.

Take either 5 or 6.

5. Make several rapid sketches, from available objects about you (books, desks, vases, fruits, flowers, window views, etc.), to show your proficiency in drawing.

6. Write about color under the following heads: —

(*a*) The six principal colors. Name three pairs of complementary colors.

(*b*) Hues, tints and shades of color, — definitions and illustrations.

(*c*) Harmony of colors, with illustrations from the flowers and the foliage of the buttercup and violet.

MUSIC.

Take either 1 or 2.

1. Draw the staff and place the signatures for the keys of F major, E major and A♭ major. Place on the staff *one* or *do* in each key.

2. Write any major scale and its relative minor.

Take 3.

3. Write in succession either the syllables or the numbers for all the notes of the following melody, separating the measures in your answer: —

Take either 4 or 5.

4. Write four measures in $\frac{3}{8}$ time. Make no two measures alike, and introduce some rests.

5. Candidates will answer such questions with reference to time as the examiner may ask.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 11 AND 12, 1900.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

1. Write a letter, properly dated, addressed, paragraphed and signed, to the principal of the normal school about your preparatory work in English.

Assume that the principal wishes to know how long and how thorough your course in English was, what books of the prescribed list you have taken under *Reading and Practice* and what under *Study and Practice*, in what respects your work under the latter head differed from your work under the former, what books of the prescribed list you like and what you dislike, what other books of literary merit you have studied, how far your teachers of other subjects than English tried to hold your speech and writing up to reputable standards, what you conceived some of the objects of your study of English literature to be, etc.

Reading and Practice.

If the candidate, instead of taking number 2 under *Reading and Practice* and number 3 under *Study and Practice*, offers an exercise book properly certified by the teacher as containing fair specimens of the candidate's written work in connection with his school study of the English prescribed, let the examiner's attention be called to the fact.

2. Take one only of the themes (*a*), (*b*), (*c*), (*d*) and (*e*).

(*a*) *Palamon and Arcite*, — the source from which the author got his material, the verse and the style in which the story is told, and an outline of the story itself.

(*b*) *Ivanhoe*, — either an account of some character who is prominent in the story or an account of the story itself, such as you might give to one who wishes to know who wrote it, with what themes and times it deals, how far it is fact and how far fiction, whether, on the whole, you like it and would advise another to read it, etc.

(*c*) *The Vision of Sir Launfal*, — any theme suggested by the poem, as, for example, any one of the following: —

The tone or spirit of the prelude to Part I.

An outline of the story of Part I.

(*a*)

Relation of the prelude to the story.

The tone or spirit of the prelude to Part II.

An outline of the story of Part II.

Relation of the prelude to the story.

(*d*) *The Princess*, — any theme suggested by the poem, as, for example, any one of the following: —

The setting or framework of the story

What the story is about.

How it ends.

The poet's attitude towards Princess Ida's university.

What the songs have to do with the story

(*e*) *The Vicar of Wakefield*, — any theme suggested by the work, as, for example, any one of the following: —

An outline of the story.

What sort of a man the Vicar was.

The Vicar in adversity and in prosperity.

The Vicar's family.

The author of the work.

Why the story stands so well in literature.

Study and Practice.

3. Take one only of the themes (*a*), (*b*), (*c*), (*d*) and (*e*).

(*a*) The sleep-walking scene in *Macbeth*, — the circumstances, the action of Lady Macbeth, the things she was impelled to talk about, the scene as a revelation of mental distress, the effect upon her attendants, the contrast between Lady Macbeth's words before the deed that disturbs her and her bearing after it, her husband's bearing before and after as compared with her own, other instances in *Macbeth* of the "false creations" of a perturbed spirit, Shakespeare's art in showing the workings of conscience, etc.

(*b*) Comments on the following passage, including the italicized portions: —

> *Thou hast it now:* King, Cawdor, Glamis, all,
> As the weird women promised, and, I fear,
> *Thou play'dst most foully for 't:* yet it was said
> *It should not stand in thy posterity,*
> But that *myself should be the root and father*
> *Of many things.* If there come truth from them —
> *As upon thee, Macbeth, their speeches shine* —
> Why, *by the verities on thee made good,*
> May they not be *my oracles as well,*
> And set me up in hope?

(*a*)

(*c*) Comments at pleasure upon the following passage: —

But now at last the sacred influence
Of light appears, and from the walls of heaven
Shoots far into the bosom of dim Night
A glimmering dawn: here nature first begins
Her farthest verge, and chaos to retire,
As from her outmost works, a broken foe,
With tumult less, and with less hostile din,
That Satan with less toil, and now with ease,
Wafts on the calmer wave by dubious light,
And, like a weather-beaten vessel, holds
Gladly the port, though shrouds and tackle torn:
Or in the emptier waste, resembling air,
Weighs his spread wings, at leisure to behold
Far off the empyreal heaven, extended wide
In circuit, undetermined square or round,
With opal towers and battlements adorn'd
Of living sapphire, once his native seat;
And fast by, hanging in a golden chain,
This pendent world, in bigness as a star
Of smallest magnitude, close by the moon.
Thither, full fraught with mischievous revenge,
Accursed, and in a cursed hour, he hies.

(*d*) Burke's speech on *Conciliation with America*: —

The occasion that called forth the speech.
The orator's purpose in giving it.
Evidences of plan in the speech.
The more characteristic features of the speech.
The good supposed to come to one from scholarly acquaintance with it.
Why it has a place in literature.

(*e*) Macaulay's *Essays on Milton and Addison*, — your choice of any themes upon which you have written in connection with your school work on either essay.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read?

2. Take either (*a*) or (*b*), but not both.

(*a*) *The meeting of Alexander with Indus the Barbarian.*

Translate into idiomatic English: —

Ac primo Alexander, non socium, sed hostem adventare credebat. Jamque et ipse arma milites capere, et equites discedere in cornu jusserat, paratos ad pugnam. At Indus, cognito Macedonum errore, jussis subsistere caeteris, ipse concitat equum, quo vehebatur. Idem Alexander quoque fecit: sive hostis, sive amicus occurreret, vel sua virtute, vel illius fide tutus. Coïvere, quod ex utriusque vultu posset intelligi, amicis animis: caeterum sine inter-

prete non poterat conseri sermo. Itaque adhibito eo, Barbarus occurrisse se dixit cum exercitu, totas imperii vires protinus traditurum; nec expectàsse dum per nuncios daretur fides. Corpus suum et regnum permittere illi, quem sciret gloriae militantem: nihil magis quam famam timere perfidiae. Laetus simplicitate Barbari Rex et dextram fidei suae pignus dedit, et regnum restituit.

Translate into Latin:—

Alexander at first thought Indus was an enemy and ordered his soldiers to get ready for battle. But Indus met him as a friend and gave up to him his person, his army and his dominion. Alexander was so pleased with Indus that he restored to him his kingdom.

(*b*) *Aeneas makes himself known to Dido at the temple of Juno.*

Tum sic reginam adloquitur, cunctisque repente
improvisus ait: 'Coram, quem quaeritis, adsum,
Troïus Aeneas, Libycis ereptus ab undis.
O sola infandos Troiae miserata labores,
quae nos, reliquias Danaum, terraeque marisque
omnibus exhaustos iam casibus, omnium egenos,
urbe, domo, socias, grates persolvere dignas
non opis est nostrae, Dido, nec quicquid ubique est
gentis Dardaniae, magnum quae sparsa per orbem.
Di tibi, si qua pios respectant numina, si quid
usquam iustitia est et mens sibi conscia recti,
praemia digna ferant. Quae te tam laeta tulerunt
saecula? Qui tanti talem genuere parentes?
In freta dum fluvii current, dum montibus umbrae
lustrabunt convexa, polus dum sidera pascet,
semper honos nomenque tuum laudesque manebunt,
quae me cumque vocant terrae.'

Aeneid I., 594-610.

FRENCH.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *The United States of America.*

Translate into idiomatic English:—

George III. régnait depuis seize ans lorsque, à quatorze cents lieues de sa capitale, plus de deux millions de ses sujets rompirent le lien qui les unissait à son trône, proclamèrent leur indépendance et entreprirent de fonder la république des États-Unis d'Amérique. Sept ans de lutte suffirent pour amener l'Angleterre à reconnaître cette indépendance, et à traiter d'égal à égal avec l'État nouveau Soixante-sept ans se sont écoulés depuis cette époque; et sans effort, sans évènements extraordinaires, par le seul dé-

veloppement de leurs institutions et d'une prospérité pacifique, les États-Unis ont pris glorieusement leur place parmi les grandes nations. Jamais grandeur si rapide n'a été si peu chèrement achetée à son origine et si peu troublée dans son progrès.

Ce n'est pas seulement à l'éloignement de tout rival puissant et aux espaces immenses ouverts devant eux que les États-Unis d'Amérique ont dû cette fortune rare. Des causes moins fortuites et plus morales ont fait aussi la rapidité et la sérénité de leur grandeur.

Ils sont entrés dans la vie sous la bannière de la justice et du droit. Pour eux aussi, la révolution qui a commencé leur histoire a été d'abord un acte de défense. Ils réclamaient des garanties et des principes écrits dans leurs chartes et que le parlement d'Angleterre, qui les leur refusait, avait jadis réclamés lui-même et fait triompher dans la mère patrie, avec bien plus de violences et de désordres que n'en entrainait leur résistance. — *Guizot.*

German.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:* —

Der Löwe mit anderen Tieren auf der Jagd.

Der Löwe, ein Schaf und andere Tiere gingen zusammen auf die Jagd. Der Löwe schwur, er wolle nach ihrer Zurückkunft alles Erbeutete mit ihnen teilen.

Als nun der Hirsch in einem Sumpfe stecken blieb, wo gerade das Schaf Wache hielt, meldete dieses dem Löwen den Vorfall. Der Löwe eilte herbei, erwürgte den Hirsch und teilte die Beute in vier gleiche Teile.

„Der erste Teil gehört mir," sagte er nun zu den Umstehenden, „weil ich der Löwe bin; — der zweite, weil ich der herzhafteste unter euch bin; — den dritten müßt ihr mir als dem stärksten überlassen, und den werde ich auf der Stelle erwürgen, welcher mir den vierten abspricht." So behielt der Löwe den ganzen Hirsch, ohne daß es seine Jagdgenossen auch nur wagen durften, darüber zu klagen.

3. *Translate into German:* —

I am the lion; so you must give me the first part. The second part belongs to me for my courage and the third for my strength The fourth part nobody dares to refuse me.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 11 AND 12, 1900.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. Determine by inspection of the factors of 60, 70 and 210 respectively how many times the least common multiple of these numbers contains their greatest common divisor.

2 Express numerically the following: —

(*a*) Four and twenty-five thousandths.

(*b*) Five thousandths.

(*c*) Eight thousand four ten-thousandths.

Divide twenty-five per cent. of the sum of (*a*), (*b*) and (*c*) by the square of (*b*).

Take either 3 or 4.

3. A owns $\frac{3}{8}$ of a lot of land. He sells $\frac{1}{2}$ of his share for $3,000. B, who owns the rest, sells $\frac{2}{3}$ of his share at the same rate. What does B sell for? Give the reasoning in full.

4. When an express train goes a mile a minute, how many kilometres per hour does it go?

ALGEBRA.

Take either 1 or 2.

1. Simplify the following: —

$$\frac{m^2 + n^2}{\frac{1}{n} - \frac{1}{m}} \times \frac{m^3 - n^3}{m^3 + n^3}.$$

2. Find the value of x in the following equation: —

$$(a - b)(x - c) - (b - c)(x - a) - (c - a)(x - b) = 0.$$

Take either 3 or 4.

3. Find the time between two and three o'clock when the hands of a clock are together. Do the work with the aid of a diagram.

(*b*)

4. Two workmen together completed some work in 20 days; but if the first had worked twice as fast and the second half as fast, they would have completed it in 15 days. How many days would it have taken each alone to complete it?

Take either 5 or 6.

5. What is a pure quadratic equation? Give an illustration of one. Solve it.

What is an affected quadratic equation? Give an illustration of one. Solve it.

6. The area of a certain rectangle is equal to the area of a square whose side is 6 inches less than the length of the rectangle. If the length of the rectangle is diminished by 2 inches and its width is increased by 1 inch, its area remains unchanged. What are the sides of the rectangle?

GEOMETRY.

Take either 1 or 2.

1. Show that if one of the legs of an isosceles triangle is produced through the vertex by its own length, the line joining the end of the leg produced to the nearer end of the base is perpendicular to the base.

2. Let A B C D be any quadrilateral and E F G H another quadrilateral whose vertices are at the middle points of A B, B C, C D and D A respectively. What kind of a quadrilateral is E F G H? Prove it.

Take either 3 or 4.

3. Prove that if two variables are constantly equal and each approaches a limit, their limits are equal.

4. Find a fourth proportional to three lines whose lengths are a, b and c respectively.

(*a*) Do the work geometrically.

(*b*) Do the work algebraically.

Take either 5 or 6.

5. What is meant by the locus of a point? What is the locus of each of the following?

(*a*) A point at a given distance from a given point.

(*b*) A point equidistant from the extremities of a line.

(*c*) The vertex of a right triangle having a given hypotenuse as a base.

(*d*) The middle points of all chords that can be drawn through a given point A in a given circumference.

6. Upon the radius of a given circle used as a diameter describe a second circle.

(*a*) How do these two circles compare with each other in area?

(*b*) Your answer rests on what geometrical principle or theorem?

(*c*) This geometrical principle or theorem is based on what preceding principles or theorems?

(*d*) Give one or two illustrations of the practical importance of a knowledge of this geometrical principle.

(*b*)

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 11 AND 12, 1900.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

If you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, make a statement to that effect, mentioning the books used, the extent of your work, and so on.

Take one number only.

1. *The Story of an Administration.* — Choose any administration from Washington's to Lincoln's and give some account of it under the following heads: —

(*a*) The president and what led to his selection.

(*b*) The political party that elected him and the principles it stood for.

(*c*) Difficulties encountered by the president and how he bore himself under them.

(*d*) Leading events in his administration.

(*e*) How the administration stands in history.

2. *Slavery*

(*a*) Its introduction and geographical distribution.

(*b*) How it led to political differences.

(*c*) Lincoln's attitude towards it.

(*d*) What the civil war settled about it.

(*e*) Problems due to slavery but still unsettled.

3. *The Spanish War of 1898.*

(*a*) The cause of the war.

(*b*) Principal naval events.

(*c*) Principal army events.

(*c*)

(*d*) Terms of the treaty with Spain.

(*e*) The Philippines, — something about them, their present condition, and the division of public sentiment as to the government's policy towards them.

4. *Notable Periods in United States History.* — Expand one of the following topics in accordance with a plan of your own : —

(*a*) Massachusetts in the provincial period as compared with Massachusetts in the colonial.

(*b*) The struggle between England and France for the control of North America (1689 to 1763).

(*c*) The critical period between the Revolution and the adoption of the Constitution.

(*d*) Industrial growth during the nineteenth century.

(*e*) The geography of recent territorial acquisitions.

(*c*)

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 11 AND 12, 1900.

IV. — SCIENCES.

At the beginning of your paper tell briefly in what sciences you have done laboratory work, kept notebooks, etc., and to what extent. Under each science *take one number or topic only, with its subdivisions.* Time for the entire paper, two hours; for each topic, twenty-four minutes.

PHYSICAL GEOGRAPHY.

1. *Description of a River.* — Let your description apply to any New England river that rises among the mountains and empties into the sea.

(*a*) Its sources of supply, and how forests are related to them.

(*b*) Contrasts between the river among the mountains and the river through the plains.

(*c*) Why its flood plains are level and its course through them winding.

(*d*) Its conveyance and deposition of material.

(*e*) How it favors human industry.

2. *The Wearing Down of the Earth's Surface.*

(*a*) Agencies in the process, and how they work.

(*b*) Illustrations of erosion that have come under your personal notice.

(*c*) Striking examples of erosion to be found in the United States.

(*d*) How the welfare of human beings is affected by erosive processes and their consequences.

(*e*) Conditions under which the erosive process must come to an end, and whether such conditions have ever been realized or not.

3. *Characteristics of a Storm.*

(*a*) The storm centre, — what it is, atmospheric pressure there as compared with the pressure farther away, and how such pressure is determined.

(*b*) The wind of the storm, — its general cause, and how it behaves on different sides of the storm centre and at varying distances from it.

(*d*)

(*c*) The rainfall of the storm, — its general cause, and the conditions on which its quantity depends.

(*d*) Weather predictions, — why they are made with so large a percentage of accuracy.

(*e*) How it happens that a storm coming up the Atlantic coast from the southwest may strike Boston with northeasterly winds. Illustrate with a diagram.

Physiology and Hygiene.

Write upon any one of the following topics, in accordance with a plan of your own, carefully selecting four or five points for treatment before you begin to write: —

(*a*) The hygiene of physical exercise.

(*b*) The hygiene of personal cleanliness.

(*c*) The heart.

(*d*) The nervous system.

(*e*) Stimulants and narcotics.

Physics.

1. *Laboratory Exercise.* — The candidate may submit a notebook of experiments that he has performed, in which case the examiner may, at his discretion, assign to the candidate for laboratory work an exercise or two from the proffered notebook, or question him upon any portion thereof.

2. *An Exercise in describing Apparatus.* — Describe any one of the following: —

(*a*) Apparatus for determining the specific gravity of a solid lighter than water.

(*b*) A common force pump.

(*c*) A barometer.

(*d*) An electric bell.

Let the description include a diagram to assist in the explanation, a presentation of the scientific principles involved, and some practical illustrations of the uses to which the apparatus may be put.

3. *Levers.*

(*a*) Represent each of the classes of levers by a diagram.

(*b*) Give a description of each class, showing the distinguishing characteristics of each.

(*d*)

(*c*) State the principle concerning the relation of power and weight which is common to all classes.

(*d*) Which of the classes can give the greatest mechanical advantage? Prove the truth of your statement.

(*e*) Show that an oar is not, as frequently stated, a lever of the first class.

4. *Heat.*

(*a*) The generally accepted theory of heat, — a clear and full presentation of it.

(*b*) The generally accepted theory of gaseous pressure.

(*c*) Effect of heating a confined body of gas, with an explanation of that effect under the theories of heat and gaseous pressure just given.

(*d*) Temperature, — what it is, how it is measured, and what properties of mercury fit it for use in determining temperature as well as what properties unfit it for such use.

Chemistry.

1. *Laboratory Exercise.* — The candidate may submit a notebook of experiments that he has performed, in which case the examiner may, at his discretion, assign to the candidate an exercise or two from the proffered notebook, or question him upon any portion thereof.

2. *Lime Water.*

(*a*) Breathe through a glass tube into lime water. Why does it become turbid? Write the equation for the chemical reaction.

(*b*) Continue to breathe into the turbid liquid until it clears again. Why does it clear?

(*c*) How can you secure in a separate state some of the matter that disappeared when the liquid became clear?

(*d*) How is lime water likely to behave when left exposed to the air? Explain.

(*e*) Processes in nature involving principles illustrated by the foregoing reactions.

3. *Fuel.*

(*a*) The essential characteristics of a good fuel, with reasons.

(*b*) Why coal possesses these characteristics in a high degree.

(*c*) The proper care of a coal fire with reference to kindling, draft, ashes, etc., with reasons for your statements.

(*d*)

(*d*) Two or three chemical reactions that occur in the burning of wood.

(*e*) Account for the white light and the smoke that accompany the burning of wood.

4. *Ammonia.*

Ammonia may be made in the laboratory by mixing certain substances in a flask and gently heating them, the reaction that occurs being represented as follows: —

$$2\,NH_4Cl + CaO_2H_2 = 2\,NH_3 + CaCl_2 + 2\,H_2O.$$

(*a*) The names, scientific and popular, for the five compounds of the foregoing equation, the quantities of matter respectively represented by their symbols, the numbers of atoms of N, H, Cl, Ca and O respectively in each member, and the combining weights for the five terms in order (N, 14; Cl, 35.5; Ca, 40).

(*b*) The number of grams of H_3N that can be made from 214 grams of NH_4Cl.

(*c*) The part played by the heat in the reaction.

(*d*) The properties of ammonia.

(*e*) The use of ammonia in the artificial manufacture of ice.

Botany.

1. *Description of a Plant.*

Describe, under the following heads, the plant furnished you by the examiner: —

(*a*) The stem and the leaves.

(*b*) The floral envelopes.

(*c*) The essential organs.

(*d*) The ovary, and, if the specimen permits it, the fruit.

(*e*) Other characteristics.

Let your description under one of the foregoing heads be accompanied by illustrative or explanatory sketches.

2. *Seeds.*

(*a*) Organs that produce seeds.

(*b*) The fertilization of seeds, — what it is, how it is brought about and the changes due to it.

(*d*)

(*c*) Two methods of storing nourishment in seeds.

(*d*) The object in this storage of nourishment.

(*e*) Peculiarities of plant structure that go with seeds having but one cotyledon.

3. *Plants as affected by External Conditions.* — Show wherein plants are dependent —

(*a*) Upon the soil.

(*b*) Upon moisture.

(*c*) Upon heat.

(*d*) Upon the atmosphere.

(*e*) Upon light.

4. *The Microscopic Organisms known as Bacteria.*

(*a*) Their prevalence and the service they render in nature.

(*b*) The relation they hold to fermentation, to decay and to disease.

(*c*) Various ways in which foods may be preserved against their ravages.

(*d*) Hygienic precautions to reduce the danger of exposure to them (in wounds, surgical operations, contagion, etc.).

(*e*) Why this topic might have been assigned a place under the head either of physiology or of chemistry.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 11 AND 12, 1900.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour, — an average of ten minutes for each number or exercise required.

DRAWING.

Take either 1 or 2.

1. Draw three views of a rectangular block that is 2 feet long, 1 foot wide and 9 inches thick. Scale, 1 inch to the foot. Indicate the scale, name the views and put in the dimensions properly.

2. Draw two views of a cup or bowl of good proportions and of pleasing outline.

Take either 3 or 4.

3. Make an outline sketch of some object in the room. Indicate the light and shade.

4. Sketch from nature some twig or branch with leaves or with leaves and flowers. Conventionalize such parts of the specimen as you choose, and use these parts in some design for a surface pattern suitable for a calico print.

Take either 5 or 6.

5. Draw from memory one of the following conventional ornamental units, naming the unit you select: the Egyptian lotus, the Greek anthemion, the Gothic fleur-de-lis. Write what you know about the unit selected.

6. Name the standard colors and hues found in a buttercup. Give two illustrations of color harmonies, one in which the colors are analogous and one in which they are complementary.

MUSIC.

Take either 1 or 2.

1. Draw the staff and place the signatures for the keys of B♭ major, A major and D major. Place on the staff *one* or *do* in each key.

2. Write the scale of F major and its relative minor.

Take 3.

3. Write in succession either the syllables or numbers for all the notes of the following melody, separating the measures in your answer: —

Take either 4 or 5.

4. Write four measures in $\frac{4}{4}$ time. Make no two measures alike, and introduce some rests.

5. Candidates will answer such questions with reference to time as examiner may ask.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 27 AND 28, 1901.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Shakespeare's *The Merchant of Venice;* Pope's *Iliad,* Books I., VI., XXII. and XXIV.; *The Sir Roger de Coverley Papers* in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Cooper's *The Last of the Mohicans;* Tennyson's *The Princess;* George Eliot's *Silas Marner;* Lowell's *The Vision of Sir Launfal.*

Add to the list other books of literary merit which you have read.

2. Write a letter to the principal of the normal school about your study and appreciation of one of the following works: —

Shakespeare's *The Merchant of Venice.*
Scott's *Ivanhoe.*
George Eliot's *Silas Marner.*
Tennyson's *The Princess.*

Treat the subject from your own point of view, and as freely and naturally as if you were writing to a friend. Assume that the principal would be pleased to receive a letter from you so written that when he has read it he cannot but say: That is a good letter; its form is satisfactory and its English reputable. What it has to say about the story or plot, or the more prominent characters, or the main drift or purpose of the work, or the emotions to which it appeals, or other selected point or points, indicates that, so far as the letter goes, the writer has an intelligent acquaintance with the book. Moreover, the letter shows that the writer has some convictions as to the enjoyable, indifferent or irksome nature — whatever it may have been — of his personal experience with the book.

3. Write briefly upon *one only* of the topics (*a*), (*b*), (*c*) and (*d*).

If the candidate, instead of writing as directed under this number, chooses to offer an exercise book properly certified by the teacher as containing fair specimens of the candidate's written work in connection with his school study of the English prescribed for *Reading and Practice,* let the examiner's attention be called to the fact.

(*a*) "Farewell, farewell! but this I tell
To thee, thou Wedding-Guest, —
He prayeth well who loveth well
Both man and bird and beast."

(*b*) *Ivanhoe,* — any theme the story suggests, as, for example, an account of your favorite character in the tale, or a description of any characteristic phase of Saxon or of Norman life portrayed therein.

(*c*) The story of the *Iliad,* — who told it, what it is about, the special themes of the four books prescribed for reading, some characteristics of Pope's translation, etc.

(*d*) Tell enough of the story in *The Vision of Sir Launfal* to illumine either any quotation you choose to make from the poem or the following passage: —

"The leper no longer crouched at his side,
But stood before him glorified."

Study and Practice.

4. Tell what books of the following list you have critically studied: Shakespeare's *Macbeth,* Milton's *Lycidas*, *Comus*, *L'Allegro* and *Il Penseroso;* Burke's speech on *Conciliation with the Colonies;* Macaulay's *Essays on Milton and Addison.*

Add to the list other books of literary merit which you have critically studied.

5. Take *one only* of the topics (*a*), (*b*), (*c*) and (*d*) that follow: —

(*a*) Comments on the following passage from *Macbeth:* —

Lady Macbeth. Know you not he has?
Macbeth. We will proceed no further in this business:
He hath honour'd me of late; and I have bought
Golden opinions from all sorts of people,
Which would be worn now in their newest gloss,
Not cast aside so soon.
Lady Macbeth. Was the hope drunk
Wherein you 'dress'd yourself? hath it slept since?
And wakes it now, to look so green and pale
At what it did so freely? From this time
Such I account thy love. Art thou afeard
To be the same in thine own act and valour
As thou art in desire? Wouldst thou lack that
Which thou esteem'st the ornament of life,

And live a coward in thine own esteem,
Letting *I dare not* wait upon *I would,*
Like the poor cat i' the adage?
Macbeth. Pr'ythee, peace:
I dare do all that may become a man;
Who dares do more is none.

Points for consideration: —

(1) *The hope drunk wherein you 'dress'd yourself.*

(2) *What it did so freely.*

(3) *Same in thine own act and valour as thou art in desire.*

(4) *The poor cat i' the adage.*

(5) The business referred to.

(6) How Macbeth came to be interested in it.

(7) The attitudes of Lord and Lady Macbeth, as Shakespeare contrasts them, towards the business previous to its consummation.

(8) Their attitudes after its consummation.

(*b*) Comments on the following passage from *Comus:* —

Break off, break off, I feel the different pace
Of some chaste footing near about this ground.
Run to your shrouds, within these brakes and trees;
Our number may affright! Some virgin sure
(For so I can distinguish by mine art)
Benighted in these woods. Now to my charms,
And to my wily trains: I shall, ere long,
Be well stock'd with as fair a herd as grazed
About my mother Circe. Thus I hurl
My dazzling spells into the spongy air,
Of power to cheat the eye with blear illusion,
And give it false presentments, lest the place
And my quaint habits breed astonishment,
And put the damsel to suspicious flight.

Points for consideration: —

(1) The setting or attendant circumstances of the passage.

(2) Some account of Circe.

(3) Justification of the following epithets: *different, wily, dazzling, spongy, suspicious.*

(4) Why Comus is called a mask.

(*c*) Burke's speech on *Conciliation with the Colonies.*

(1) The conditions or impelling motives that led to the making of this speech.

(2) Specific points in the speech that have been impressed upon your mind as the results of your study.

(3) Expand three or more of the six capital sources mentioned in the following extract enough to show how each contributed, as Burke alleges, to the spirit of liberty: —

"Then, sir, from these six capital sources — of descent, of form of government, of religion in the northern provinces, of manners in the southern, of education, of the remoteness of the situation from the first mover of the government — from all these causes a fierce spirit of liberty has grown up."

(4) Some account of the general spirit that shaped Burke's life or of his relations to Warren Hastings or of the alleged inconsistency of his views on the French revolution.

(*d*) Macaulay's *Essay on Addison* : —

(1) Some characteristics of Addison as a man or writer impressed upon your mind by study of the essay.

(2) Some characteristics of Macaulay as a writer gathered from your study of the essay.

The essay on Milton may be substituted for that on Addison.

LATIN.

1. What Latin authors or works have you studied, and how much of each have you read? Have you studied French or German? If so, to what extent?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Gallic Deities. Consecration of the Spoils of War to Mars.*

Translate into idiomatic English : —

Deorum maxime Mercurium colunt. Huius sunt plurima simulacra; hunc omnium inventorem artium ferunt, hunc viarum atque itinerum ducem, hunc ad quaestus pecuniae mercaturasque habere vim maximam arbitrantur. Post hunc Apollinem et Martem et Iovem et Minervam. De his eandem fere quam reliquae gentes habent opinionem: Apollinem morbos depellere, Minervam operum atque artificiorum initia tradere, Iovem imperium caelestium tenere, Martem bella regere. Huic, cum proelio dimicare constituerunt, ea quae bello ceperint plerumque devovent; cum superaverunt, animalia capta immolant, reliquas res in unum locum conferunt. Multis in civitatibus harum rerum exstructos cumulos locis consecratis conspicari licet. Neque saepe accidit ut neglecta quispiam religione aut capta apud se occultare aut posita tollere auderet; gravissimumque ei rei supplicium cum cruciatu constitutum est.

(*b*) *How the Trojans were divided by the Gift of the Greeks.*

Translate into idiomatic English : —

Pars stupet innuptae donum exitiale Minervae,
et molem mirantur equi; primusque Thymoetes
duci intra muros hortatur et arce locari,
sive dolo, seu jam Trojae sic fata ferebant.
at Capys, et quorum melior sententia menti,
aut pelago Danaum insidias suspectaque dona
praecipitare jubent, subjectisque urere flammis,
aut terebrare cavas uteri et temptare latebras.
scinditur incertum studia in contraria volgus.

Primus ibi ante omnis, magna comitante caterva,
Laocoön ardens summa decurrit ab arce,
et procul: 'O miseri, quae tanta insania, cives?
creditis avectos hostis? aut ulla putatis
dona carere dolis Danaum? sic notus Ulixes?
aut hoc inclusi ligno occultantur Achivi,
aut haec in nostros fabricata est machina muros
inspectura domos venturaque desuper urbi,
aut aliquis latet error; equo ne credite, Teucri.
quicquid id est, timeo Danaos et dona ferentis.'
sic fatus, validis ingentem viribus hastam
in latus inque feri curvam compagibus alvum
contorsit: stetit illa tremens, uteroque recusso
insonuere cavae gemitumque dedere cavernae.
et, si fata deum, si mens non laeva fuisset,
impulerat ferro Argolicas foedare latebras,
Trojaque, nunc stares, Priamique arx alta, maneres.

Aeneid II., 31-56.

French.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *Translate into idiomatic English:* —

Les idées et les passions qui, au nom de la démocratie, emportent et désorganisent aujourd'hui les sociétés, sont répandues et puissantes dans les États-Unis d'Amérique; elles y fermentent avec tout ce qu'elles contiennent d'erreurs contagieuses et de vices destructeurs. Mais elles ont été jusqu'ici efficacement contenues et épurées par la foi chrétienne, par les excellentes traditions politiques et les fortes habitudes de légalité qui gouvernent la population. En même temps que les principes d'anarchie se déploient audacieusement sur ce vaste théâtre, les principes d'ordre et de conservation y subsistent, solides et énergiques, dans la société et dans l'homme lui-même; on reconnaît partout leur présence et leur influence, au sein même du parti qui se qualifie du nom de parti démocratique par excellence; ils le tempèrent et le règlent, et souvent le sauvent, à son insu, de ses fougueux entraînements. Ce sont ces principes tutélaires qui ont présidé aux origines de la révolution américaine, et lui ont donné le succès. Fasse le ciel que, dans la lutte redoutable qu'ils ont aujourd'hui à soutenir partout, ils continuent de prévaloir au milieu de ce puissant peuple, et qu'ils le détournent toujours à temps des abîmes qui sont si près de ses pas! — *Guizot.*

German.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

2. *Translate into idiomatic English:—*

Eine witzige Antwort.

Friedrich Wilhelm der Erste von Preußen war sehr witzig und hatte gern witzige Leute um sich. Ein junger Mann hoffte durch seinen Witz eine Stelle am Hofe zu erhalten. Er ging jeden Tag in den Garten des Königs, weil er hoffte den König dort zu sehen. Eines Morgens traf er ihn wirklich. Der König ging zu ihm und begann mit ihm zu sprechen. Er erhielt schnelle und gute Antworten und schien damit zufrieden zu sein. Der junge Mann faßte Mut und bat um eine Stelle die zur Zeit leer war. Der König überlegte einen Augenblick und sagte: „Ich kann Ihnen jetzt nichts versprechen. Ich muß zuerst mit meinem Minister reden. Aber sagen Sie mir, woher kommen Sie?" „Ich bin ein Berliner, Ihre Majestät." „Es thut mir leid," sagte der König, „denn alle Berliner taugen nichts." „Ich bitte um Entschuldigung, Ihre Majestät, aber es giebt unter ihnen auch gute Leute," sagte der junge Mann. „Ich selbst kenne zwei." „Wer sind diese zwei?" fragte der König. „Der eine," antwortete der Mann, „ist Ihre Majestät, und der andere bin ich." Der König lächelte, und am folgenden Morgen erhielt der Mann die gewünschte Stelle.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 27 AND 28, 1901.

II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. *To test accuracy of work.*

Add four hundred seventy-six and five tenths, seven hundred eighty-four and thirty-five thousandths, nine hundred thirty-two, one thousand twenty-nine and five thousandths, one thousand six hundred fifty-four and forty-six hundredths; subtract from the sum thus obtained twenty-five per cent. of it; square the difference; and divide this square by two thousand six, carrying the division to one decimal place.

2. *To test power in explaining a rule.*

(*a*) Give the rule for the multiplication of decimal fractions.

(*b*) Illustrate the rule.

(*c*) Give in full the reason for the rule.

Take either 3 or 4.

3. *To test power of analysis. Give the reasoning in full.*

If 4 men working 8 hours a day can mow a meadow in 3 days, how many men working 9 hours a day can mow a meadow three times as large?

4. *To test power of reaching results by brief methods. Give the reasoning.*

A bin 10 feet long, 3 feet wide and 18 inches deep, inside measurements, holds when full 36 bushels of corn.

(*a*) If its width is increased by 3 inches, how many bushels will it hold?

(*b*) If its depth is increased by 3 inches, the other dimensions remaining unchanged, how many bushels will it hold?

(*c*) If every dimension is increased by 3 inches, how many bushels will it hold?

(*d*) An increase of 3 inches in which one of the three dimensions most increases the capacity of the bin? Why?

Algebra.

Take either 1 or 2.

1. Find by inspection the greatest common divisor and the least common multiple of $3x^2-12$, $5x^2-10x+20$ and $7x^2+21x-70$.

2. Add $\frac{x^2+x+3}{x^3+1}$ to $\frac{x-2}{x^2-x+1}$ and subtract $\frac{1}{x+1}$ from their sum.

Take either 3 or 4.

3. Given the following equations: —

$$bx-cy=5.$$
$$cx+by=7.$$

Find the value of y (not of x) by each of the following methods in order: —

(*a*) Elimination by addition or subtraction.
(*b*) Elimination by comparison.
(*c*) Elimination by substitution.

4. A number is divided by d, and the sum of the quotient, the dividend and the divisor is b.

(*a*) Find the number.
(*b*) Frame a rule for solving all similar problems.
(*c*) Apply the rule when $d=12$ and $b=129$.

Take either 5 or 6.

5. The sum of the squares of three successive even numbers is 776. What are the numbers?

6. A man walking $\frac{1}{8}$ of a mile per hour above his ordinary gait gains $\frac{3}{4}$ of an hour in 39 miles. Find his ordinary rate of walking.

Geometry.

Take 1.

1. Select any proposition about a triangle or triangles, and prove it.

Show by the clearness and accuracy of your thought as well as by the neat and orderly arrangement of your work what your idea is of an excellent written demonstration.

Take either 2 or 3.

2. Write the propositions on which answers to the following questions depend: —

(*a*) A plot of ground in the shape of a rhombus has straight paths connecting opposite corners. If one of these paths follows a north and south line, what is the direction of the other?

(*b*) How many square feet are there in a board 14 feet long, 18 inches wide at one end and 26 inches wide at the other?

(*c*) A tree casts a shadow 90 feet long when a vertical rod 3 feet high casts a shadow 4 feet long. How tall is the tree?

(*d*) The radii of two circles are a feet and b feet respectively. The area of the first is m square feet. What is the area of the second?

3. Demonstrate any one of the four propositions that should be given in answer to the preceding number.

Take 4, 5 or 6.

4. What is meant by the locus of a point? What is the locus of each of the following?

(*a*) A point at a given distance from two parallel lines.

(*b*) The vertices of all equivalent triangles standing on the same base.

(*c*) The centre of a circle whose circumference passes through two given points.

(*d*) The vertex of a right triangle having a given hypotenuse as a base.

5. Find a fourth proportional to three lines whose lengths are a, b and c respectively.

(*a*) Show how the work is done by geometry.

(*b*) Do the work by algebra.

6. Give the successive area theorems, without demonstrating them, that lead up to and include the theorem that gives the area of a circle.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 27 AND 28, 1901.

III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

Take 1.

1. State whether you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, mentioning the books used, the extent of such work, and so on.

Take 2, 3 or 4.

2. *Washington's Administration.*

(*a*) Two parties in the cabinet, the leader and the policy of each, and the policy that, on the whole, dominated the administration.

(*b*) The financial policy of the administration, who shaped it, how it dealt with war debts, and what the general effect of the policy proved to be.

(*c*) How the government raised money, what led to the Whiskey Insurrection, how the administration handled it, and what lesson was impressed upon the people because of such handling.

(*d*) The administration's French policy, — reasons urged for a policy of friendly aid to France, reasons urged against such a policy, and the policy finally adopted.

3. *The Civil War.*

(*a*) Causes that brought on the war.

(*b*) Comparison of the North and the South at the beginning of the war as to elements of strength and weakness, the estimate placed by each on the other's attitude, the expectation of success entertained by each, etc.

(*c*) Comparison of the North and the South at the end of the war.

(*d*) Some results of the war.

4. *Miscellaneous Topics.* — If the candidate takes neither 2 nor 3, let him take one of the following topics, and expand it in his own way: —

(*a*) Massachusetts in the provincial period.

(*b*) The critical period between 1783 and 1789.

(*c*) The Louisiana purchase.

(*d*) The rise and fall of slavery.

(*e*) Civil service.

Take either 5 or 6.

5. *The Northwest Territory.*

(*a*) The region included in this territory.

(*b*) The States that claimed to own it, the basis on which their claims rested, and how these claims stood in the way of forming a satisfactory union.

(*c*) The ordinance of 1787.

(*d*) What the Northwest Territory has contributed to the United States in the way of States, population, resources, spirit, etc.

6. *Region of the Great Lakes.*

(*a*) A sketch or diagram (the accuracy of a map is not called for) to show the relative positions of the Great Lakes, what States border upon them, and where at least five of the larger lake cities are located. Attach the name in every instance.

(*b*) Water communication between the Great Lakes and the sea, — routes, hindrances, measures to overcome them, etc.

(*c*) Growth of the lake cities, — the nature, rapidity and magnitude of this growth, with reasons therefor.

(*d*) The countries that own the Great Lakes, their policy with reference to war vessels thereon, and your personal reasons for approving or disapproving that policy.

(*c*)

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 27 AND 28, 1901.

IV. — SCIENCES.

Time for the entire paper, two hours; for each of its five divisions, twenty-four minutes.

PHYSICAL GEOGRAPHY.

Take 1, 2 or 3.

1. *The Weathering of Rocks.*

(*a*) What is meant by the weathering of rocks?

(*b*) Show how various forces work to produce this weathering.

(*c*) How may one determine whether the soil at the base of a cliff has resulted from weathering or has been brought there by other agencies?

(*d*) Illustrations of weathering personally seen by you.

2. *Rainfall.*

(*a*) Two things essential to the formation of rain.

(*b*) Cite one or two regions of great rainfall and give the reasons therefor.

(*c*) Cite one or two regions of slight rainfall and give the reasons therefor.

(*d*) The relation of rainfall to human activities.

3. *Rivers.*

(*a*) Their wearing action upon the earth.

(*b*) Their transportation of material.

(*c*) Their flood plains and deltas.

(*d*) Illustrations of river action which you have personally observed.

PHYSIOLOGY.

Take 1, 2 or any Topic under 3.

1. *The Blood.*

(*a*) Composition of the blood.

(*b*) Use of each part.

(*c*) Changes in the blood due to passing through the tissues.

(*d*) Changes in the blood due to passing through the lungs.

2. *Effects of Alcohol upon the Human System.*

(*a*) Whether alcohol is a food or a poison.

(*b*) Some of the immediate effects of alcoholic drinking, with reasons therefor.

(*d*)

(*c*) Some of the more remote and insidious effects, with reasons therefor.
(*d*) The moral deterioration produced by alcoholic drinking.

3. *Topics for Development.*
If the candidate chooses this number, let him take one of the following topics and develop it in his own way: —
A Mouthful of Bread from Mastication to Assimilation.
The Hygiene of Physical Exercise.
Animal Heat.
Automatic Activity.

Physics.

Take 1.

1. Tell concisely about your study of physics, — the text-book used, the time given to it, the amount covered, to what extent, if any, experiments were performed by the teacher, to what extent, if any, you had laboratory practice, etc.

Take 2, 3, 4 or 5.

2. *Laboratory Exercise.* — The candidate may submit a notebook of experiments performed by him, in which case the examiner may, at his discretion, assign to the candidate for laboratory work an exercise or two from the proffered notebook or other source, or question him upon any portion of the notebook.

3. *An Exercise in describing Apparatus.* — With the aid of a diagram describe the construction of any one of the following pieces of apparatus, giving an illustration of its use, and explaining clearly and fully the principles involved in such use: —
A Barometer.
A Specific Gravity Apparatus for a Solid lighter than Water.
A Bicycle Pump.
A Galvanometer.

4. *Heat.*
Explain scientifically —
(*a*) How perspiration cools the body.
(*b*) Why greenhouses are made of glass.
(*c*) Why hot water is more likely to break thick glass than thin.
(*d*) What causes the winds.

5. *Electro-magnets.*
(*a*) Describe and illustrate by diagram a simple method of making an electro-magnet.
(*b*) State the *principle* (not the *law*) concerning the poles of a magnet.
(*c*) Name three or four instruments in which the electro-magnet is used.
(*d*) Explain with the aid of a diagram some one of these instruments.

CHEMISTRY.

Take 1.

1. Tell concisely about your study of chemistry,— the text-book used, the time given to it, the amount covered, to what extent, if any, experiments were performed by the teacher, to what extent, if any, you had laboratory practice, etc.

Take 2, 3, 4 or 5.

2. *Laboratory Exercise.* — The candidate may submit a notebook of experiments performed by him, in which case the examiner may, at his discretion, assign the candidate for laboratory work an exercise or two from the proffered notebook or other source, or question him upon any portion of the notebook.

3. *Electrolysis of Water.*

(*a*) Make a simple sketch of the apparatus in operation, name the parts and indicate the action.

(*b*) How would you proceed to learn the properties of the two gases produced?

(*c*) What are the evidences that these gases are the only constituents of pure water?

(*d*) What law of chemistry is illustrated in the electrolysis of water?

4. *Nitric Acid.*

(*a*) Use KNO_3 and H_2SO_4 in making nitric acid. Write the chemical equation for the reaction and translate it into popular language.

(*b*) How much HSO_4 is required to decompose 400 grams of KNO_3? (K, 39.)

(*c*) How much nitric acid can be produced with 400 grams of KNO_3?

(*d*) What else is produced in the reaction and how much of it?

5. *Topics for Development.*

If the candidate chooses this number, let him take one of the following topics and develop it in his own way: —

Oxidation and Reduction.

Acids and Bases.

Carbonic Dioxide.

Iron, its Extraction from its Ores and its Three Principal Varieties.

BOTANY.

Take 1, 2 or any Topic under 3.

1. *Description of a Plant.*

Describe the plant furnished you by the examiner, limiting your description to the following points: —

(*a*) The leaf.

(*b*) The floral envelopes.

(*c*) The essential organs.

(*d*)

(*d*) The ovary, and, if the specimen permits it, the fruit.

Let the description under one or more of the foregoing heads be accompanied by illustrative or explanatory sketches.

2. *Storage of Food Material in Plants.*

(*a*) The plant's need of a store of reserve food.

(*b*) Organs in which food is stored.

(*c*) Various forms in which reserve food is stored.

(*d*) Evidence that the plant draws upon this reserve.

3. *Topics for Development.*

If the candidate chooses this number, let him take one of the following topics and develop it in his own way: —

Germination of Seeds.

Roots.

Relation of Insects to Plants.

The Classification of Plants.

(*d*)

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

JUNE 27 AND 28, 1901.

V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour — an average of ten minutes for each number or exercise required.

DRAWING.

Take either 1 or 2.

1. Draw three views of a triangular prism whose length is 2 feet and whose ends are equilateral triangles of 1 foot base. Scale, 1 inch to the foot. Indicate the scale, name the views and put in the dimensions properly.

2. Draw two views of a bottle of good proportions and pleasing outline.

Take either 3 or 4.

3. Make a sketch of some object in the room. Indicate the light and shade.

4. Draw from nature some spray with leaves and flowers. Make a decorative spot or unit of design suggested by the flower.

Take either 5 or 6.

5. Write about color under the following heads: (*a*) the spectrum; (*b*) color scales; (*c*) color harmonies.

6. Tell what you know about one of these pictures, and the person who painted it: —

The Madonna of the Chair.
The Horse Fair.
The Gleaners.
The Golden Stairs.

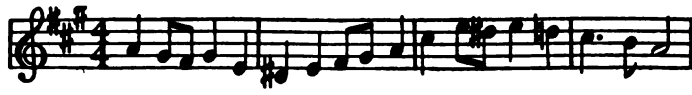
MUSIC.

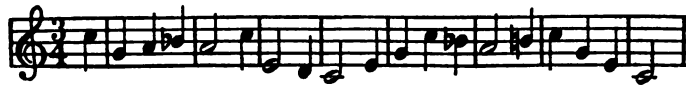
Take 1.

1. Write on a staff with the G clef, in the key of F, the first six measures of "Auld Lang Syne," "America," or some other equally familiar melody.

Take either 2 or 3.

2. Write in succession either the numbers or the syllables for all the notes of either of the following melodies, separating the measures in your answer: —





3. Sing either of the above melodies to the examiner.

EXAMINATION FOR ADMISSION TO THE MASSACHUSETTS STATE NORMAL SCHOOLS.

SEPTEMBER 10 AND 11, 1901.

I. — LANGUAGES.

The candidate will take English and *one only* of the remaining languages, — Latin, French and German. Time for the entire paper, two hours.

ENGLISH.

Reading and Practice.

1. Tell what books of the following list you have read: Shakespeare's *The Merchant of Venice;* Pope's *Iliad,* Books I., VI., XXII. and XXIV.; *The Sir Roger de Coverley Papers* in *The Spectator;* Goldsmith's *The Vicar of Wakefield;* Coleridge's *The Ancient Mariner;* Cooper's *The Last of the Mohicans;* Tennyson's *The Princess;* George Eliot's *Silas Marner;* Lowell's *The Vision of Sir Launfal.*

Add to the list other books of literary merit which you have read.

2. Write a letter to the principal of the normal school about your study and appreciation of one of the following novels or poems: —

Scott's *Ivanhoe.*
Cooper's *The Last of the Mohicans.*
Coleridge's *The Ancient Mariner.*
Lowell's *The Vision of Sir Launfal.*

Limit the letter to two or three points of your own choice. Write freely and naturally, as if to a friend. Assume that the principal would be pleased to say of your letter: Its form is excellent and its English creditable. Its treatment of the points chosen is intelligent so far as it goes. There are signs, moreover, that the writer has some measure of appreciation or relish for the work he is considering.

Hints: How you studied the work in school, what it is about, its main purpose, spirit or lesson, the emotions to which it appeals, a character or two in it that you like, some traits of the author's style or workmanship, etc.

3. Write briefly upon *one only* of the topics (*a*), (*b*), (*c*) and (*d*).

If the candidate, instead of writing as directed under this number, chooses to offer an exercise book properly certified by the teacher as containing fair specimens of the candidate's written work in connection with his school study of the English prescribed for *Reading and Practice*, let the examiner's attention be called to the fact.

(*a*) The story of the *Iliad*, — who told it, when and where it was told, what it is about, and the special themes of the four books prescribed for reading.

Or this: —

Pope's translation of the *Iliad*, — some features of the original which it retains and some which it misses.

(*b*) The historical period of *The Last of the Mohicans* as contrasted with that of *Ivanhoe*.

(*c*) Portia and the Princess Ida, — a comparison based on the following passages: —

"But the full sum of me
Is sum of something, which, to term in gross,
Is an unlesson'd girl, unschool'd, unpractis'd;
Happy in this, she is not so old
But she may learn; happier than this,
She is not bred so dull but she can learn;
Happiest of all is that her gentle spirit
Commits itself to yours to be directed,
As from her lord, her governor, her king."
— *The Merchant of Venice.*

"I wed to thee! I bound by precontract
Your bride, your bondslave! not tho' all the gold
That veins the world were pack'd to make your crown,
And every spoken tongue should lord you. Sir,
Your falsehood and yourself are hateful to us;
I trample on your offers and on you;
Begone: we will not look upon you more."
— *The Princess.*

(*d*) *Silas Marner*, — either the different stories which are brought together to make up its plot or the two events that so influenced the chief actor in the story as to change the course of his subsequent life.

Study and Practice.

4. Tell what books of the following list you have critically studied: Shakespeare's *Macbeth*; Milton's *Lycidas*, *Comus*, *L'Allegro* and *Il Penseroso*; Burke's speech on *Conciliation with the Colonies*; Macaulay's *Essays on Milton and Addison*.

Add to the list other books of literary merit which you have critically studied.

(*a*)

5. Take *one only* of the topics (*a*), (*b*), (*c*) and (*d*) that follow: —

(*a*) *Macbeth.* Which of you have done this?
Lords. What, my good lord?
Macbeth. Thou canst not say I did it; never shake
Thy gory locks at me.
Ross. Gentlemen, rise; his highness is not well.
Lady Macbeth. Sit, my worthy friends: my lord is often thus,
And hath been from his youth; pray you, keep seat;
The fit is momentary; upon a thought
He will again be well; if much you note him
You shall offend him and extend his passion.

Answer the following questions on the foregoing passage: —

(1) The occasion?

(2) *Which of you have done this,* — done what?

(3) *Thou canst not say I did it,* — the person addressed and the thing done?

(4) Why *will* and not *shall* in the line next to the last?

(5) Why *shall* and not *will* in the last line?

(6) In the stage presentation of the scene ought the presence with the gory locks to be visible to the audience? Reason for your opinion?

(7) What conspicuous change takes place in the conscience of Macbeth as the tragedy progresses?

(8) In the conscience of Lady Macbeth?

(*b*) "Now to my charms,
And to my *wily* trains: I shall, ere long,
Be well stock'd with as fair a herd as grazed
About my mother Circe. Thus I hurl
My *dazzling* spells into the *spongy* air,
Of power to cheat the eye with *blear* illusion,
And give it false presentments, lest the place
And my quaint habits breed astonishment,
And put the damsel to *suspicious* flight."
— *Comus.*

Answer the following questions upon the foregoing passage: —

(1) Why is *Comus* called a mask?

(2) Circe's magic power?

(3) Reasons for the italicized epithets?

(4) The metre adopted by the poet?

(*a*)

(*c*) "Then, sir, from these six capital sources — of descent, of form of government, of religion in the northern provinces, of manners in the southern, of education, of the remoteness of the situation from the first mover of the government — from all these causes a fierce spirit of liberty has grown up." — *Conciliation with the Colonies.*

Answer the following questions upon the foregoing passage: —

(1) Select any one of the six capital sources mentioned and show how Burke connects it with the fierce spirit of liberty.

(2) Burke's purpose in dwelling upon this fierce spirit of liberty?

(3) Burke's plan of conciliation with the colonies as compared with the policy actually adopted by the English government?

(4) Why the speech is commended to the schools for study?

(*d*) Macaulay's *Essay on Milton.*

Take one of the following themes: —

(1) Some things you have learned about Macaulay's power and style as a writer.

(2) Conditions, according to Macaulay, that made it difficult for Milton to write poetry, but over which he triumphed.

Hints: The period of life when imagination is most active; the state of society in which the poetic temperament is at its highest; the effect of advancing civilization on this temperament; the general nature of the obstacles, therefore, with which Milton as a poet had to contend, and the greatness of his triumph over them.

Latin.

1. What Latin authors or works have you studied, and how much of each have you read? Have you studied French or German? If so, to what extent?

2. Take either (*a*) or (*b*), but not both.

(*a*) *Translate into idiomatic English:* —

Relinquebatur una per Sequanos via, qua Sequanis invitis propter angustias ire non poterant. His cum sua sponte persuadere non possent, legatos ad Dumnorigem Aeduum mittunt, ut eo deprecatore a Sequanis impetrarent. Dumnorix gratia et largitione apud Sequanos plurimum poterat, et Helvetiis erat amicus, quod ex ea civitate Orgetorigis filiam in matrimonium duxerat; et cupiditate regni adductus novis rebus studebat et quam plurimas civitates suo beneficio habere obstrictas volebat. Itaque rem suscipit, et a Sequanis impetrat ut per fines suos Helvetios ire patiantur, obsidesque uti inter sese dent perficit: Sequani, ne itinere Helvetios prohibeant; Helvetii, ut sine maleficio et iniuria transeant. — *Cæsar, Book I., 9.*

(*b*) *Translate into idiomatic English:* —

Dixit, et avertens rosea cervice refulsit,
Ambrosiaeque comae divinum vertice odorem
Spiravere, pedes vestis defluxit ad imos,
Et vera incessu patuit dea. Ille ubi matrem
Adgnovit, tali fugientem est voce secutus:
Quid natum totiens, crudelis tu quoque, falsis
Ludis imaginibus? cur dextrae iungere dextram
Non datur ac veras audire et reddere voces?
Talibus incusat, gressumque ad moenia tendit.
At Venus obscuro gradientis aere saepsit,
Et multo nebulae circum dea fudit amictu,
Cernere ne quis eos, neu quis contingere posset,
Molirive moram, aut veniendi poscere caussas.
Ipsa Paphum sublimis abit, sedesque revisit
Laeta suas, ubi templum illi, centumque Sabaeo
Ture calent arae sertisque recentibus halant.

FRENCH.

1. Tell what you have done in the study of French, — the time spent, the authors read, and so on. Have you studied Latin or German? If so, to what extent?

2. *Translate into idiomatic English:* —

L'Angleterre possédait donc, vers 1750, au delà de l'Atlantique, un véritable empire colonial. Les treize colonies, qui devaient, vingt cinq ans plus tard, s'unir pour leur affranchissement, occupaient toute la côte, sans solution de continuité du Kennebec au nord à la rivière Sainte-Marie au sud. Les trois établissements les plus puissants et les plus riches étaient la Virginie, le Massachusetts et la Pensylvanie; les plus faibles, le Delaware et la Géorgie, celle-ci tout récemment fondée (1732). Ces groupes de population différaient entre eux par le climat, le genre des cultures, l'origine des populations, les croyances, les conditions d'existence. Le climat du nord était propice à la multiplication des petites fermes, celui du sud an régime des grandes plantations. Le travail libre, personnel, dans le nord, pouvait seul arracher à la terre un produit dont on pût vivre. Dès le début de la colonisation, le travail des noirs parut, dans le sud, une condition indispensable de succès. L'esprit d'aventure et la défaite de la royauté peuplèrent la Virginie; le Maryland fut d'abord un refuge pour les catholiques; la persécution des puritains créa les républiques de la Nouvelle-Angleterre. — *Moireau.*

GERMAN.

1. Tell what you have done in the study of German, — the time spent, the authors read, and so on. Have you studied Latin or French? If so, to what extent?

(*a*)

2. *Translate into idiomatic English:* —

Kaiser Wilhelm I. war einmal auf der Jagd, an welcher auch viele andere Fürsten teilnahmen. Als er etwas müde geworden war, beschloß er allein nach Hause zu gehen. Doch zwei andere Herren bemerkten bald seine Absicht, und gingen mit. Sie waren ein Stückchen des Weges gegangen, als ein Bauer mit einem Wagen sie überholte, der in derselben Richtung mit ihnen ging. Einer der Herren bat den Führer, sie für eine angemessene Belohnung eine Strecke mitzunehmen, wozu er gern einwilligte. Die Monarchen stiegen ein, und fort ging es auf dem harten Bauernwagen.

Bald wandte sich der neugierige Bauer an einen der Herren mit der Frage: „Wer sind Sie denn?" „Ich bin," war die Antwort, „der Großherzog von Mecklenburg." „So!" rief der Landmann lachend, und sprach zu dem zweiten: „Wer sind Sie denn?" „Ich bin," erwiderte dieser, „der König von Sachsen.„ „Ei, das ist ja[1] immer besser!" rief der Bauer. Endlich wandte er sich an den dritten Jäger: „Und wer sind Sie?" Ich bin Wilhelm, Kaiser von Deutschland," antwortete er. „Ach, das ist mir aber zu viel!" rief der Bauer, halb verdrießlich, halb lachend, und peitschte die Pferde; „ich hätte[2] nicht gedacht, daß solche alten würdigen Herren noch Gefallen daran finden könnten, einen Bauern so zu foppen. Doch, damit Sie auch wissen wer Sie fährt, so will ich es Ihnen sagen: Ich bin — der Schach von Persien."

(*a*)

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II. — MATHEMATICS.

The candidate will take the three subjects. Number of questions in all to be answered, eight. The full work is wanted. Time allowed for the entire paper, two hours.

ARITHMETIC.

Take either 1 or 2.

1. Multiply $\frac{41}{5000}$ by $7\frac{1}{20}$ and divide their product by $\frac{141}{200000}$.

(*a*) Do the work by the method of cancellation.

(*b*) Change each fraction to a decimal and perform again the operations indicated.

2. A sold a carriage to B and gained $7\frac{1}{2}$ per cent. B sold it to C for \$141.90 and lost 12 per cent. How much did the carriage cost A? Give the reasoning in full.

Take either 3 or 4.

3. A can do a piece of work in 5 days; B can do the same in 7 days. How long will it take them to do the work together? Give the reasoning in full.

4. Divide a cube whose edge is 4 inches into smaller cubes each with an edge of $\frac{1}{12}$ of an inch. How does the sum of the surfaces of all the smaller cubes compare with the surface of the original cube?

ALGEBRA.

Take either 1 or 2.

1. (*a*) What are the factors of $x^2 + x - 2$?

(*b*) What are the factors of $3x^2 - x - 2$?

(*c*) What is the G.C.D. of $x^2 + x - 2$ and $3x^2 - x - 2$?

(*d*) What is the L.C.M. of $x^2 + x - 2$ and $3x^2 - x - 2$?

2. From $\frac{x}{x-1}$ take $\frac{x-1}{x}$ and multiply the remainder by $1 - \frac{1}{2x-1}$.

(*b*)

Take either 3 or 4.

3. Find two numbers whose sum is a and whose sum is to their difference as a to b.

(*a*) Solve the example, using one unknown quantity.

(*b*) Solve the example again, using two unknown quantities.

4. Find the value of x in the following: —

$$\frac{a+1}{x} : \frac{b}{x} = (a+x) : (b+x)$$

Take either 5 or 6.

5. The sum of p dollars at simple interest for t years at r per cent. will amount to a dollars; that is, $a = p + prt$.

(*a*) Find p from this formula.

(*b*) Translate the formula for p into a rule.

(*c*) With the aid of the formula for p, find what principal in 6 years at 4 per cent. will amount to $620.

6. If the length and breadth of a certain rectangle are reduced by 8 feet and 1 foot respectively, there will be formed a square whose area is $\frac{4}{9}$ that of the rectangle. What is the side of the square?

Geometry.

Take 1.

1. Select any proposition relating to a quadrilateral and prove it.

Show by the clearness and accuracy of your thought as well as by the neat and orderly arrangement of your work what your idea is of an excellent written demonstration.

Take either 2 or 3.

2. Answer the following questions, writing after each answer the proposition on which the answer depends: —

(*a*) What is the area of a trapezoid whose altitude is m and whose parallel sides are $2m$ and $3m$ respectively?

(*b*) Is there any difference between the sum of the interior angles of a hexagon that is regular and the sum of the interior angles of a hexagon that is not regular?

(*c*) What is the diagonal of a square whose side is a?

(*d*) On the radius of a circle as a diameter describe another circle. The second circle is what fraction of the first in area?

3. AB, AC and AD are the diameter, a chord and a tangent respectively of a circle. What is the measure of the angle CAD? Prove it.

(*b*)

Take 4, 5 or 6.

4. Give in order the successive area propositions, without demonstrating them, on which the demonstration of the area of a circle is based.

5. Demonstrate the area of a circle, using the method of limits.

6. Let R be the radius of a circle. Answer the following questions in terms of R: —

(*a*) What is the side of an inscribed square?

(*b*) What is the apothem of an inscribed hexagon?

(*c*) What is the area of an inscribed square?

(*d*) What is the area of an inscribed hexagon?

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III. — HISTORY AND GEOGRAPHY.

Time allowed for this paper, one hour.

Take 1.

1. State whether you have done any collateral reading in connection with your study of United States history, or have studied the history of any other country, mentioning the books used, the extent of such work, and so on.

Take 2, 3, 4 or 5.

2. *The Colony of Massachusetts Bay.*

(*a*) Its founders, and wherein they differed from the Pilgrims.

(*b*) Two or three facts to illustrate the union of Church and State.

(*c*) A typical colonial village or town, — its principal buildings and the nature of its government.

(*d*) How the colony came to lose its charter in 1684, with some consequences of the loss.

3. *France and the Mississippi Valley.*

(*a*) The French claim to the Mississippi Valley, — its foundation and the difficulties experienced by France in enforcing it.

(*b*) Disposition of this claim in 1763 as a result of the French and Indian War.

(*c*) The Louisiana Purchase, — how it came about and the location and extent of territory involved.

(*d*) Why the hundredth anniversary of the Louisiana Purchase is to be celebrated by a great exposition in St. Louis in 1903.

4. *Jackson and his Administration.*

(*a*) Jackson as a man.

(*b*) How he came to be President.

(*c*) The spoils system, — what it is, what Jackson's relation to it was, the national policy towards it to-day and some reasons for that policy.

(*c*)

(*d*) Nullification, — what is meant by it, why South Carolina entered upon the policy, Jackson's attitude towards it, and the value of that attitude to the country.

5. *Service rendered the Country by Eminent Men.* — Give an account of one or more items of important service rendered the country by each of the following men: —

(*a*) Benjamin Franklin.

(*b*) Alexander Hamilton.

(*c*) Daniel Webster.

(*d*) Abraham Lincoln.

Take 6 (one topic only).

6. *Miscellaneous Topics.* — Take one only of the following topics, analyzing and expanding it in your own way: —

(*a*) *Weaknesses of the Confederation and how they were remedied by the Constitution.*

(*b*) *Jefferson and his Administration.*

(*c*) *The Mexican War.*

(*d*) *The Geneva Arbitration.*

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IV. — SCIENCES.

Time for the entire paper, two hours; for each of its five divisions, twenty-four minutes.

PHYSICAL GEOGRAPHY.

Take 1, 2 or 3.

1. *Land Forms as affected by Natural Agencies.* — Show how land forms have been affected by *any four* of the following agencies, giving an illustration in each case: —

(*a*) Water action.

(*b*) Ice action.

(*c*) Air action.

(*d*) Plant action.

(*e*) Animal action.

(*f*) Heat action.

2. *Ponds and Lakes.*

(*a*) As expansions of streams of water, with illustrations.

(*b*) As fresh-water bodies and salt, with illustrations and reasons.

(*c*) As related to swamps, meadows and regions reclaimed, with illustrations.

(*d*) As related to human industry, with illustrations.

3. *Ocean Water and Fresh Water.* — Compare ocean water with fresh in respect to each of the following points: —

(*a*) Composition.

(*b*) Weight, with one or two illustrations.

(*c*) Distribution and abundance.

(*d*) The process by which each may be changed or become merged into the other.

(*d*)

Physiology.

Take 1, 2 or any topic under 3.

1. *The Skin.*

(*a*) The skin, — its structure, with modifications thereof, and its sensibility.

(*b*) Sweat, — what it is and what service it renders the system.

(*c*) The skin as a regulator of bodily temperature.

(*d*) Physiological reasons for personal cleanliness.

2. *Ventilation of the Schoolroom.*

(*a*) Ways in which the air of an unventilated schoolroom becomes vitiated.

(*b*) Carbonic dioxide (CO_2) as an index of the degree of vitiation.

(*c*) Physiological reasons for breathing pure air.

(*d*) Conditions to be met in order to have satisfactory ventilation.

3. *Topics for Development.*

If the candidate chooses this number, let him take one of the following topics and develop it in his own way: —

(*a*) *Arteries and Veins.*

(*b*) *Respiration.*

(*c*) *Reflex Movements.*

(*d*) *Effects of Alcohol upon the Human System.*

Physics.

Take 1.

1. Tell concisely about your study of physics, — the text-book used, the time given to it, the amount covered, to what extent, if any, experiments were performed by the teacher, to what extent, if any, you had laboratory practice, etc.

Take 2, 3, 4 or 5.

2. *Laboratory Exercise.* — The candidate may submit a notebook of experiments performed by him, in which case the examiner may, at his discretion, assign to the candidate for laboratory work an exercise or two from the proffered notebook or other source, or question him upon any portion of the notebook.

3. *An Exercise in describing Apparatus.* — With the aid of a diagram bring out the fundamental principles involved in one of the following mechanisms or pieces of apparatus: —

(*a*) *The Air Pump.*

(*b*) *The Barometer.*

(*c*) *The Steam Engine.*

(*d*) *The Electric Telegraph.*

4. *Atmospheric Pressure.*

(*a*) Description of some experiment to show atmospheric pressure.

(*b*) The cause of atmospheric pressure.

(*c*) A method of measuring such pressure.

(*d*) The relation of atmospheric pressure to the winds, to the boiling point of liquids, and to the comfort of people in deep mines and on high mountains.

5. *The Refraction of Light.*

(*a*) The laws of refraction.

(*b*) The effect of a double-convex lens on parallel rays passing through it, with a diagram.

(*c*) The formation of an image, as of an arrow, by means of a double-convex lens, with a diagram.

(*d*) Chromatic aberration, — what it is, its effect on an image and the remedy.

CHEMISTRY.

Take 1.

1. Tell concisely about your study of chemistry, — the text-book used, the time given to it, the amount covered, to what extent, if any, experiments were performed by the teacher, to what extent, if any, you had laboratory practice, etc.

Take 2, 3, 4 or 5.

2. *Laboratory Exercise.* — The candidate may submit a notebook of experiments performed by him, in which case the examiner may, at his discretion, assign the candidate for laboratory work an exercise or two from the proffered notebook or other source, or question him upon any portion of the notebook.

3. *Electrolysis of Water.*

(*a*) Make a simple sketch of the apparatus used in the electrolysis of water, name the parts and indicate the action.

(*b*) Some properties of each of the two gases produced?

(*c*) What are the evidences that these gases are the only constituents of pure water?

(*d*) What law of chemistry is illustrated in the electrolysis of water?

4. *Carbonic Dioxide.*

(*a*) How it may be made and collected.

(*b*) The chemical equation for the reaction.

(*c*) Experiments to show some of its properties.

(*d*) A method of showing its presence and quantity in a room.

5. *Topics for Development.*

If the candidate chooses this number, let him take one of the following topics and develop it in his own way: —

(*a*) *Oxygen.*

(*b*) *Hydrogen.*

(*c*) *Flame.*

(*d*) *Ammonia.*

Botany.

Take 1, 2, 3 or any topic under 4.

1. *Description of a Plant.*

Describe the plant furnished you by the examiner, limiting your description to the following points: —

(*a*) The leaf.

(*b*) The floral envelopes.

(*c*) The essential organs.

(*d*) The ovary, and, if the specimen permits it, the fruit.

Let the description under one or more of the foregoing heads be accompanied by illustrative or explanatory sketches.

2. *The Flower.*

(*a*) Reasons for regarding the flower as a transformed branch.

(*b*) Characteristics of the typical flower, and to what extent they are realized in flowers in general.

(*c*) The function of the flower, and ways in which the flower serves that function.

(*d*) Why flowering is an exhaustive process, with illustrations of the fact.

3. *The Trunk of a Common Tree.*

(*a*) Diagram to show the principal features of a cross section, with a description.

(*b*) Life and action of the trunk, — where they reside, and what things may befall the trunk without disturbing them.

(*c*) The ragged bark and the buried knots of the trunk.

(*d*) Differences between a trunk, as of a pine tree, growing in a dense forest and a trunk growing in the open field, with explanation.

4. *Topics for Development.*

If the candidate chooses this number, let him take one of the following topics and develop it in his own way: —

(*a*) *Storage of Food Material in Plants for Subsequent Use.*

(*b*) *Leaves and their Functions.*

(*c*) *Fertilization of Ovules.*

(*d*) *The Relationships of Plants,—why they exist, with Illustrations of Natural Groupings.*

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V. — DRAWING AND MUSIC.

The candidate will take both drawing and music. Time for the entire paper, one hour; average time for each number or exercise, twelve minutes.

DRAWING.

Take either 1 or 2.

1. Make two views of a hollow cylinder 2 feet long, 1 foot in diameter outside, and 8 inches in diameter inside. Scale, 1 inch to the foot. Add the dimensions properly and state the significance of the different conventional lines required in making the drawing.

2. Draw two views of a book, — one cover and the back. Indicate the position of the lettering.

Take either 3 or 4.

3. Sketch from memory some bird or animal. State what you have drawn.

4. Draw from nature some spray with leaves and flowers or fruits.

In an oblong $2 \times 3\frac{1}{2}$ inches make a decorative arrangement of the spray, and place the spot containing your initials so that it will add to the beauty of the design.

Take either 5 or 6.

5. Describe the coloring of the goldenrod. Tell what harmony of color it illustrates. How does it differ from the harmony of color in the purple aster?

6. Give an account of one of the following artists and mention some of his famous pictures: —

Raphael,	Millet (French),
Rosa Bonheur,	Burne-Jones.

MUSIC.

Take 1.

1. Write on a staff with the G clef, in the key of B♭, the first six measures of the "Old Folks at Home," of "Home, Sweet Home," or of "Auld Lang Syne."

Take either 2 or 3.

2. Write in succession either the numbers or the syllables for all the notes of either of the following melodies, separating the measures in your answer: —

3. Sing either of the above melodies to the examiner.